# The Chemical Age

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# Notes and Comments

## The Wheat Area Reduction

THOUGH sixty-six nations of the world have been unable to agree about the economies of production, a limited number of them have been able to agree within the unprecedentedly short time of four days upon a reduction of the world's annual wheat harvest. The reduction of 15 per cent. is the more noteworthy because so famous a scientist as the late Sir William Crookes predicted in 1898, from then known data, that within thirty years there would be a wheat famine. The population of the world has certainly increased as fast as Crookes could have expected, but where there should have been a famine there is a surplus so great that the nations of the earth must take counsel together to reduce production. We should be sadly lacking in vision and imagination did we not see in this event one of the greatest tributes to the power of chemistry and the chemist that the world has ever paid. The wheat surplus is largely because for the past generation scientific men have devoted so large a proportion of their energy to "making two grains grow where but one grew before." If this process may seem to have gone a little too far, surely the world should not blame the scientific man and chemical industry for doing their job rather better than was expected.

It is infinitely better that we should be discussing what to do with a surplus—in every field—than that we should be searching frantically—as in Russia—for the wherewithal to be satisfied. The scientific man has done his work well; the industry has backed up the research workers by fearlessly spending huge sums in development; the result is seen in the great synthetic ammonia factories that convert atmospheric nitrogen into potential food; in experimental undertakings such as Rothamsted and Kew where the effects of the fertilisers and many another germane factor is studied in its relation to British and Empire plants; and in similar institutions throughout the world. It is not only in regard to wheat that production of agricultural products has had to be curtailed. All these achievements give us confidence in the future of mankind. If the scientific men and the industry which makes use of their results are given sufficient time in which to work, there is no limit to their potentialities.

## Displaced German Scholars

TWO of our correspondents, among others our old friend Professor Armstrong, have voiced their protest against the installation in British professorships of the scientific men of renown displaced by the German Governmental policy. We support the protest. We feel that whilst a temporary interchange of teachers must be all to the good, it is not well to put British youth, at an age when character and outlook are being formed, under the domination of foreigners. There is more in it than the study of science; there is the national outlook. The character that made the Briton what he is to-day was moulded in insularity. We agree, moreover, that posts for which many young men have striven through years of drudgery should not be taken from them and given to others—however eminent—who happen to have "left home." There are many educated men in this country whom stress of circumstances have compelled to undertake work for which they are not normally fitted. Nevertheless, we have nothing but sympathy for the work of the Academic Assistance Council which has been founded to conserve the great body of scholarship displaced in Germany. This council is actively collaborating with similar academic assistance committees in United States and on the Continent. Out of some 750 workers known to have been displaced temporary opportunities for continuing their work have been found for 50 in Great Britain, the expense being met from funds not otherwise available for the universities. It seems to be proposed to proceed largely by the creation of special temporary posts financed from entirely separate funds. This is a better system, but it cannot in the nature of things be permanent. The only real solution of the difficulty is no doubt for the displaced savants to find their feet among new surroundings as teachers, as industrial workers and so forth, as many another has done in this country in the past. We welcome them to these shores, our only protest being against the policy in certain institutions of taking the plums from our own people.

## Charcoal Burning

THERE was a time when charcoal burning was a highly important industry and was practised to some extent in England. We do not know whether there exists any plant for the complete distillation of wood in this country. The industry is still alive, though not vigorous in other lands. It is an example of a type of manufacture that has been killed by synthetic chemistry, aided by the disappearance of raw material. The charcoal industry has the advantage that it is possible to grow trees for the purpose within a few years. In the East and hot countries, where vegetation is still profuse and where it grows rapidly, charcoal burning may be possible indefinitely if the products can be sold. The main product, charcoal, is unlike any other material; low temperature coke, the nearest approach to it, is yet quite different.

It is of interest to observe that charcoal is again beginning to make its presence felt. It is competing

with the oil industry. The competition of gas with petrol for the propulsion of heavier vehicles is largely in the lime-light just now, even though in the experimental stage. It is less generally known that an equally determined though less-heralded attempt is being made to popularise small producers burning charcoal or low temperature coke for similar vehicles and lorries. Two motor vans using producer gas generated from charcoal instead of petrol have just left England on a demonstration tour in the Far East. The lorries are fitted with a portable producer which stands on the near running board; the gas is a mixture of straight producer gas and water gas and is cleaned before being fed to the engine. It is claimed according to a paper read before the World Petroleum Congress that the fuel cost is only about one-quarter of that of a petrol-driven wagon. Charcoal, for all its decay in the northern countries, is still an everyday product in many parts of the world, and possibly this latest development will enable the industry to be revived in conjunction with proper re-aforestation schemes in England. Agriculture might be assisted materially by a sound charcoal burning industry. In 1908 it was possible to write that "in Europe alone the capital invested the dry distillation of wood industry exceeds £40,000,000." Can we bring back this industry by finding other outlets for its products? It would be interesting to hear the views of a wood distillation expert on the relative value of the by-products and on the part which the market for the by-products must play in any attempt to rehabilitate the industry here.

## Art and Craftsmanship

WE have previously referred in these notes to the work of Professor A. P. Laurie on the chemistry of oil paintings. The Art School of the Royal Academy is unique in that upon the staff is a professor of chemistry whose business it is to deliver lectures to art students on the scientific aspects of their craft. This lectureship is about eighty years old and Professor Laurie is the third holder of the post. This art school, moreover, comprises a laboratory designed primarily for the preparation of lecture experiments, but those who know what is being done there realise that Professor Laurie has made it a home of research in the art of paints and properties of all materials used in painting. There are many firms engaged in the preparation of artists materials, whether these be canvasses, pigments, or oils and varnshes. Much of the work done at the Royal Academy school could hardly be undertaken in private laboratories, as all who were privileged to hear Professor Laurie's address to the Society of Chemical Industry last winter must realise. These are the days of associations and of combined research. There would seem to be a very definite opportunity for those engaged in the manufacture of artists' materials to collaborate with the Art School of the Royal Academy in order to assist both themselves and the artist. It would seem possible that artists in the future will no longer demand from the manufacturer finished paints but will prefer to have certain raw materials provided from which he may make his own colours. Much of the success of the Old Masters was due to the manner in which they mxed their paints and to the fact that they were craftsmen. It is often held that machinery has killed craftsmanship, but signs are not wanting of a reaction in which craftmanship will come back again into its own—but it will be a diffeent " own."

Speaking at the Plastics Exhibition, Mr. H. V. Potter said that mass production limited the fulfillment of the taste and desires of the purchaser. He felt that the craftsman would again flourish but on some higher plane than a century or so ago. This revival of decorative craftsmanship will be the opportunity for the plastics industry. That is another direction in which chemistry is assisting the craftsman. The permanence of oil paintings might be increased by using a non-inflammable plastic base instead of canvas. We commend the suggestion to Professor Laurie. Since plastics lend themselves to imaginative treatment we forsee a new form of art in which a moulded plastic base is painted.

## New Ventures

EVERY new industrial venture calls for courage, perseverance and confidence, as with the journey into an unexplored country. There is much in common between these two things, but one big difference is present. In the industrial venture there is no need to strike blindly into the unknown in order to reach your goal, for there are guides available who know the dependable routes which should be taken at each stage of the journey. These guides offer you their services. By accepting such service you will eliminate much guesswork and speculation so far as raw materials, processes, plant, costs, and the distribution of final products are concerned. Each guide has intimate knowledge of the field in which he claims to specialise. When you have to select plant you will find that many of the engineering concerns, which are ready to guide you, actually maintain a completely appointed laboratory where their recommendations can be proved on a semi-technical scale. It is in such places as these that you will find plant actually in operation, and can inspect it at your convenience. When it is a matter of heat technology there are other guides who will tell you all that you need to know about heating mediums which fill the gap between direct fire and refrigeration—steam, hot air, hot water, hot oil and mercury vapour.

## "Carrots"

IN this connection we refer to the early history and development of the hat and fur industry! It was the use of nitric acid in place of urea nitrate as a felting agent which gave rise to the term " carrot." Later mercury was introduced and it is still used as mercury nitrate. The subject is being discussed by Mr. Kennedy Nahas, at the Chicago meeting of the American Chemical Society, when there will be a discussion of the functions of why excess nitric acid is used in the preparation of mercury nitrate and on the use of the mercury salts in the " carrot." Mention is being made of the chemical hazards in connection with the felting process when using mercury compounds, whilst the advantages of substituting hydrogen peroxide is also being discussed. Such a paper is one of industrial significance, if only for the purpose of pointing out the need of much study by the chemist and engineer in connection with one of many processes which do not receive the prominence due to them.

# Progress in the Vanillin Industry

## Natural and Synthetic Processes

ALTHOUGH synthetic vanillin, the methyl ether of protocatechuic aldehyde, does not entirely duplicate the flavour of natural vanilla, it is, nevertheless, the chief constituent. British manufacturers, however, concerning themselves only with clove oil as raw material, and whilst the market for clove oil has fixed the price of vanillin, the foreign synthetic product is able to enter into competition and keep the price low. The natural extract from the vanilla pods contains 20 per cent. of vanillin plus related products, the rest being resins, etc., of an aromatic type, the latter having no flavouring value. Maceration and percolation methods of extraction are usually adopted, using spirit containing 40 to 50 per cent. alcohol, although for economy it has been the rule to add glycerol or sodium carbonate to replace a proportion of spirit in the solvent.

### Manufacture from Eugenol

The manufacture of vanillin itself may be conducted in two directions, *viz.*, the conversion of eugenol from oil of cloves into vanillin, or the synthesis of vanillin from guaiacol, pyrocatechol or piperonal. Oil of cloves containing 90 per cent of eugenol is the raw material in this country, production of vanillin being carried out prior to 1914. The first stage is the conversion of eugenol into iso-eugenol by heating in a copper still a charge of clove oil with 60 per cent. of potash in water, whereby the potassium salt of eugenol is obtained. On further heating to 210° C., other constituents of clove oil such as terpenes are distilled over, the potassium eugenol being then freed from excess potash. By heating the potassium salt in an organic solvent such as aniline, potassium isoeugenol is formed, and this may be oxidised by nitrobenzene in presence of alkali to give vanillin. The latter is extracted with toluene after distilling off excess nitrobenzene plus aniline. Alternative methods of procedure for effecting the above transformation are found in the use of alcoholic KOH under pressure for combining the formation of the potassium eugenol and conversion into the iso-eugenol salt; the use of a fusion method and of both KOH and NaOH for the last half of the transformation; and the alternatives for oxidation of isoeugenol which utilise ozone or a chromic acid solution.

When ozone is used with unprotected iso-eugenol, it is safer to carry out the oxidation in presence of sodium bisulphite; otherwise the side chain of the iso-eugenol molecule can not be oxidised to an aldehyde group without danger of resinification with the phenolic groups present. Abroad, it appears to be the practice to protect the phenolic group by acetylation, when either ozone or acidified sodium bichromate is to be used as oxidiser. With a chromic acid oxidiser it is also advantageous to include sulphanilic acid as a controlling catalyst; and with ozone it has been found possible to convert unprotected iso-eugenol provided a fine suspension in water and a low temperature are used. When, however, an acetylated isoeugenol is used, a xylene solution is employed, and the vanillin formed is extracted as the bisulphite compound.

### Synthesis from Piperonal

A second starting-point is piperonal or heliotropine, $C_6H_3(OCH_2O)CHO$, the active constituent of the oil from the heliotrope flower. This substance is now manufactured from iso-safrole by cautious oxidation with an acid bichromate solution. From the piperonal obtained, protocatechuic aldehyde is prepared by the action of $PCl_5$ and hydrolysis of the residue (after distilling off $POCl_3$); the aldehyde is then methylated with dimethyl sulphate in presence of sodium ethylate. An alternative manufacturing method for protocatechuic aldehyde constitutes yet a further source of vanillin. This alternative is the action of chlorine on phenol followed by hydrolysis with baryta to give pyrocatechol; the latter is condensed with formaldehyde in presence of iron turnings, hydrochloric acid and *m*-nitrobenzenesulphonic acid; and the condensation product hydrolysed by acid to give the desired protocatechuic aldehyde.

A third basic material is guaiacol, the possibilities of manufacturing vanillin from this body having attracted considerable attention. For guaiacol is available in appreciable quantities from the fractionation of tars in the wood distillation industry. The phenol may be condensed with hydroxylamino-benzene sulphonic acid and the product hydrolysed; with nitrosodimethylaniline, followed by hydrolysis; or condensation with alloxan. The latter method is a triumph for the research chemist, since the series of reactions starts with guano and finishes with vanillin! The first step is to extract uric acid from the guano (which contains 25 per cent.), and to convert the acid into alloxan by the action of chlorine or an oxidiser. Alloxan is now condensed with guaiacol by use of sulphhuric acid, and the product hydrolysed with caustic soda; by the further action of $SO_2$ there is obtained vanilloyl carboxylic acid, which is isolated as a salt of an amine like toluidine; $CO_2$ is now eliminated from the carboxyl group and the vanillin liberated by means of caustic soda.

### The Search for New Methods

Since production by the above synthetic methods is laborious and yields vanillin contaminated with isomeric orthovanillin, other sources and methods of extraction are appearing. The possibility of utilising sulphite cellulose waste liquors has been studied by Kürschner and by Honig and Ruziczku. When the liquors are boiled with sodium hydroxide, vanillin is found in the liquid. If air be passed through during the boiling, or the liquor be heated for three hours at 160° to 170° under 5 atmospheres, the yield is considerably increased. Kürschner also reports that considerable amounts are formed by the air treatment, so that if guaiacol from wood tar becomes less in favour as a source of vanillin, waste liquors from an alternative treatment of wood may take its place. A process protected by Eng. Pat. 319,747 advocates the use of peat powder, lignite or brown coal, which is oxidised below 90° with the calculated amount of chromic acid or other oxidiser. After extraction of vanillin from the residue, it is claimed that further quantities are obtained by hydrolysis of residual mother liquors with acid. From 100 kg. peat it is claimed that 1.1 kg. of vanillin is obtained; while from the same amount of pine sawdust, maple wood meal, and elm wood meal, there are obtained respectively 2 kg., 2.45 kg., and 3.2 kg. of vanillin.

Where the processes have not been altered in the main theme, alternative methods of isolation are appearing. For example, it is found that vanillin forms acid sodium salts of the type R.ONa.ROH, these being sparingly soluble, while the acid potassium salt may be prepared in alcohol. A second favourable method is to isolate the crude vanillin as the bisulphite compound, to decompose this with sulphuric acid, and to centrifuge the vanillin, distil in vacuo, and finally crystallise from water containing carbon dioxide.

# A New I.C.I. Acid Dyestuff

## Lissamine Cyanine

LISSAMINE Cyanine as an addition to the I.C.I. range of acid dyestuffs, is suitable for dyeing yarns and piece goods where brilliancy of shade and fairly good fastness to washing is desired. It possesses very good level dyeing properties and on this account is suitable for application to woollen piece goods where cheapness is of greater consideration than light fastness. It may be used either as a self shade or as a component of mode shades on ladies' dress goods, again subject to the above proviso. Lissamine Cyanine AS is of interest for dyeing natural and tin-weighted silks on account of its good affinity for these fibres and for the brilliancy of the shades produced. It is suitable for printing on all animal fibres giving shades which possess only moderate fastness to washing, but will be of little interest for the dyeing of ground shades on wool and silk for subsequent discharging owing to its tendency to return on exposure to air and light. This dyestuff is also of interest for application to vegetable tanned leathers and for use in brush staining work.

# High Lights of Modern Industrial Chemistry

## Symposium by the American Chemical Society

AT their Chicago meeting to be held September 10-15, the American Chemical Society are holding a symposium on "High Lights of Modern Industrial Chemistry" to cover the subjects of solvents, detergents, cellulose, synthetic rubber and synthetic resins.

Dealing with the modern solvent industry, E. W. Reid will point out that new solvents have appeared during the past ten years at an approximate rate of twelve per year, and in 1932, their volume reached 900,000,000 lb., excluding the petroleum and aromatic hydrocarbons. Solvents are used in practically every industry and contribute in some manner to the necessities, luxuries and arts of the present day. The nitrocellulose lacquer industry is probably the largest single user for solvents. The new type of solvents sometimes replace the older and better-known products of the industry, but on the whole, tend to contribute to the general knowledge of the application of solvents, which in turn contributes to the increased use of the older products.

### New Detergents

According to another paper by R. A. Duncan, on the subject of new detergents, soap has at least two serious limitations. It can not be used except in neutral or alkaline solutions, as acid decomposes it giving free fatty acids which have no detergent value, whilst it forms insoluble soaps with the heavy metal salts found in practically all natural waters. These objections, however, are both overcome by the use of sodium alkyl sulphates, the alkyl group being of the range of $C_{12}$ to $C_{18}$. Such products are typical of a group which are resistant to the effect of acid in moderate concentrations and which form soluble salts with the alkaline earth metals and the more common metals. They prevent the formation of any scum or slime such as is formed by soap in hard water, but since the heavy metal alkyl salts are also good detergents, there is no loss in efficiency.

### Synthetic Rubber

The field of research into synthetic rubber will be covered by W. H. Carothers. The conversion of isoprene into elastic materials has been known for 50 years, but the chemical structure of rubber is not fully known, and rubber cannot be fully defined in the ordinary physical and chemical terms. The uniqueness of rubber lies in its combination of high elasticity and great strength. In the practical problem of preparing artificially a material of these properties, the polymerisation of isoprene furnishes the usual starting point, but isoprene is not easily available and the products yet obtained are much inferior to rubber. Butadiene and dimethylbutadiene are more available but no better; modifications of the diene structure affect the rate of its polymerisation. Many new dienes have lately been synthesised and relations between structure and behaviour are known. Chloroprene and bromoprene polymerise to rubber-like products far more readily than any other known dienes, and the products are in some respects superior to natural rubber.

Although the synthetic rubber "DuPrene" differs chemically from natural rubber, it bears a closer physical resemblance to rubber than any of the previously known synthetic rubbers. After vulcanisation, according to E. R. Bridgewater, in a supplementary paper, it possesses all of the properties that distinguish rubber from any other engineering material in as great or greater degree than the natural product. It has superior aging properties, longer curing range and greater oil resistance than natural rubber, but like the latter it must be vulcanised in order to develop its desirable properties in the maximum degree and for most industrial uses is compounded with various reinforcing pigments or fillers.

### Synthetic Resins

Modern developments in synthetic resins, will be outlined by Carleton Ellis, showing that the newer oil-soluble phenol-aldehyde resins now serve as the basis for varnishes of great durability. From some of the new resins of this type waterproof cloth is being made. Transparent and translucent resins which rival celluloid in their appearance but which possess many advantages are rapidly assuming another prominent position. The moulding of large acid-proof vessels is an accomplishment which indicates even greater potentialities in the application of these materials. Urea resins are fast being adopted for the moulding of inexpensive light-coloured articles, and the use of these resins in non-creasable fibres for textiles illustrates the unusual range comprehended by this field. Among the new coating materials which are coming to the fore are the rezyls, cashew liquid, chlorinated rubber, styrene and petroleum resins. The applications of various chlorinated paraffins, chlorinated diphenyls, and other resinous materials which have attained some recent commercial prominence are also developments of significance.

# Trade in Newfoundland

## Dependence on Foreign Markets a Handicap

NO improvement in the general state of trade in Newfoundland has been noted during the past two years. This rather sweeping but by now familiar statement is the predominating tone of the latest report published by the Department of Overseas Trade on economic conditions in Newfoundland (H.M. Stationery Office, price 2s. 2d., post free).

The country is almost entirely dependent on outside markets for the sale of its products, and a general improvement in other countries is essential before any recovery is possible. As regards internal trade, prosperity is largely dependent on the condition of the fisheries, although the value of the output from this industry is not so great as that from the newsprint mills, which during the fiscal year 1931-32 were responsible for more than 57 per cent. of the total exports. Newfoundland was the only country in North America to produce more newsprint in 1931 than 1930, but a slight drop occurred in 1932.

The report states that the mining industry offers great opportunities for further development, and advantage would naturally be taken of these in normal times. An important mining industry in Newfoundland is the production of lead and zinc concentrates at Buchans. During 1932 average prices for lead and zinc continued to drop and reached still lower levels than in 1931. Despite the low prices which are threatening to interrupt the continuity of operations the mill was operated at full capacity throughout the year 1932. Of a total of 130,895 short tons (dry weight) produced in 1932, the shipments to the United Kingdom amounted to 57,605 short tons. There are certain mining areas at St. Lawrence containing deposits of fluorspar. Preparations were being made in April, 1933, for the mining of 2,000 tons for experimental purposes. Should the venture prove successful it will no doubt lead to development on a larger scale.

### Cod Liver Oil and Chemicals

Business with the United States in the cod liver oil trade during the past year was fairly good, although prices were lower than ever. Very little, however, has been exported to the United Kingdom market owing to the low prices at which foreign oils have been offered there. At the Ottawa Conference in 1932, the United Kingdom granted a preference of 1s. 4d. per gal. on Newfoundland cod liver oil. This duty has only recently been put into effect by the respective governments. The production of cod liver oil in Newfoundland during 1932 was estimated at from 250,000 to 300,000 gal., practically all of which was exported to foreign markets, principally the United States and Canada.

As regards imports, which consist largely of manufactured goods, an important group of products is oil seeds, oils, fats and gums, five-sixths of which are shipped from Canada. The principal item in this group consists of petroleum products imported by Imperial Oil, Ltd., for the sale of which they hold a monopoly in the island.

The total imports of chemicals, drugs, dyes and colours amounted to about £90,000, of which the United Kingdom supplied approximately £18,500. Explosives and heavy chemicals are used by the mining companies and by the newsprint manufacturers.

# The Italian Chemical Industries

## A Survey of its Present Position

THIS survey is reprinted from the official organ of the Italian Export Institute, which aims at making Italy's productive capacity and products better known abroad.

AMONG the several branches of productive activity the Italian chemical industries have acquired of late years, and more especially since the war, a clearly defined character of their own which they did not possess in all countries in pre-war days. The output of these industries now covers a vast field ranging from fertilisers to soaps, from explosives to seed-oils, from synthetic dye-stuffs to tanning extracts, and so on, not to mention such categories as rubber, sugar, rayon, etc., which have a character of their own which distinguishes them, under certain aspects, from the chemical industry in general.

### Heavy Chemicals

The industries specialising in the production of such heavy chemicals as sulphuric acid, phosphatic fertilisers, electrolithic soda, nitric acid, boric acid, etc., date back to pre-war days and their activities now cover an extensive field. While the output of some of these products has declined as compared to that of past years, for others, such as bromides, iodine, nitrogenous fertilisers, aluminium, paint media, etc., of prime importance for Italian economic activities, the output shows satisfactory growth. The smaller output of 50-52° Bé sulphuric acid (1,100,000 metric tons in 1929 and 660,000 in 1932), of the phosphatic fertilisers obtained therefrom (1,300,000 metric tons in 1929 and 660,000 in 1932) and of bone glue (7,680 metric tons in 1929 and 5,200 in 1932) is offset by increased quantities of nitric acid (39,000 metric tons at 36° Bé in 1929 and 110,000 in 1932), now obtained synthetically and mostly used in the preparation of nitrogenous fertilisers, especially nitrate of lime, the output of which has risen from 9,850 metric tons in 1929 to 65,186 in 1932. Likewise, the output of bi-ammoniacal phosphates, started in 1930, rose to 11,000 metric tons in 1932. The output of other nitrogenous fertilisers has varied but little; sulphate of ammonia 140,000 metric tons in 1929 and 123,000 in 1932; calcium cyanamide, 63,300 metric tons in 1929 and 77,900 in 1932; the output of ammonia nitrate has, however, fallen from 12,500 metric tons in 1929 to 6,300 in 1932.

There has been a decline in the output of hydrochloric acid (41,200 metric tons in 1929, 30,900 in 1932), and in that of caustic soda (76,700 metric tons of soda in 1932), and in that of solution in 1929 against 61,300 and 48,000 metric tons respectively in 1932). The output of carbonate of soda, net of the quantities converted into caustic soda, has fallen from 110,000 metric tons in 1929 to 94,000 in 1932. This product which, along with caustic soda, Italy began to manufacture only a few years before the war, is now used on a large scale by the home market in manufacturing a number of products of which many come within the scope of the chemical industries (alkaloids, silicates, soaps, synthetic organic dyestuffs, mineral pigments, etc.), and it can safely be said that Italy is now thoroughly well equipped for turning out this group of products which are at the basis of most of the other chemical industries.

### Synthetic Ammonia

The total Italian output of nitrogen has grown slowly from year to year: from an almost negligible figure in 1922, it rose rapidly to about 58,000 metric tons in 1932. This figure clearly shows the level attained by this branch of production in Italy, which now not only ranks with the world's leading producing countries but can also claim the honour of inventing two of the leading systems of production of synthetic ammonia, the Casale and Fauser processes, now applied on a vast scale in a large number of foreign countries.

The output of boric products is also on the increase (4,400 metric tons of unrefined boric acid in 1929, and 7,000 in 1931). The Tuscan industry, which extracts boric acid from the natural steam jets, stands in a class apart, for it also utilises the steam given off by these jets, converting it into electric power. The output of copper sulphate, which has risen from 66,000 metric tons in 1929 to 99,000 in 1932, has been accompanied by a notably larger output of anticryptogamic preparations, more especially those with an arsenical base, of which Italy is becoming an ever larger producer.

Calcium carbide (average annual output 95,000 metric tons) until recent years used mainly in the preparation of calcium cyanamide and acetylene, is now also used as a raw material in the production of synthetic acetic acid, which has almost entirely replaced that distilled from wood (total output 1,905 metric tons at 100 per cent. in 1929 and 6,550 in 1931) and acetic anhydride, used in manufacturing rayon by the acetate process, now slowly taking its place by the side of the viscose process.

### Methyl Alcohol

In 1932 the output of synthetic methyl alcohol (methanol) approximated 1,100 metric tons. Mention should also be made of the output of butyl alcohol and acetone, simultaneously obtained from the aceto-butylic fermentation of maize, and used as a medium for cellulose paints, together with other special media now being produced in increasing quantities. Synthetic camphor, another important branch of Italian chemical production, has risen in a short time to over 400 metric tons per annum.

The several industries so far referred to are carried on by a group of over 250 firms owning some 350 factories, employing nearly 20,000 workers. The central nucleus is formed by the plants manufacturing sulphuric acid and fertilisers, most of which also turn out bone glue as well as other products. The electrochemical plants (soda and chlorine) are 5 in number, leaving out of account some small factories making hypochlorites.

### Explosives and Compressed Gases

The factories making explosives, now engaged more especially in making blasting powder for mine-charges and gunpowder for game-shooting, are, however, fully equipped for the whole range of production. In 1929 a total of some 10,000 metric tons of explosives of various kinds was produced, but the output fell off to some 7,500 metric tons in 1932 as a result of the reduced demand for blasting powder by the building and road-making trades. Some 70 firms, owning 75 plants, employing over 3,700 workers, are engaged in this industry.

Besides oxygen the compressed gas industry handles hydrogen, chlorine, ammonia, carbon anhydride, sulphur dioxide, etc. Compressed oxygen is, however, the leading product, with an average annual output approximating 9 million c. metres. Oxygen, in conjunction with the acetylene obtained from calcium carbide already referred to, is used on a large scale for the oxy-hydrogen soldering process. The hydrogen, chlorine, and ammonia gasses sold in drums account for only a minimum part of the quantities produced for the manufacture of soda by the electrolytic process and nitrogenous fertilisers to which we have already referred. This group of industries is carried on by about 50 firms owning approximately 60 plants employing over 1,500 workers.

The Italian plastic material industry, producing synthetic resins, celluloid, and artificial horn, is steadily expanding. The output of synthetic resins has grown considerably of late, and amounted to some 1,000 metric tons in 1932. For some years past the output of celluloid has fluctuated around 650 metric tons per annum, while that of artificial horn has varied between 300 and 400 metric tons. The qualities manufactured consist mainly of zoolite, galalite, etc. The industry is carried on in 10 factories employing in all about 600 workers.

The synthetic dyestuff industry is one of those which have grown up since the war. It owes its origin in Italy to the increased output during the war years of tar by-products required in the manufacture of several products essential for national defence. When the war came to an end, leaving these plants behind it as a legacy, the idea arose of using them for setting up a national intermediate product industry as a basis for the manufacture of dyestuffs. As a result, in a short time the Italian synthetic dyestuff industry raised

itself to the level attained in other countries more extensively equipped for this branch of production, and now the variety of dyes produced and the scientific methods employed place Italy among the countries which have successfully completed the preparatory stage of work in this field.

Italian factories now turn out both indanthrene and vat dyes as well as the whole range of sulphur dyes. The total output of intermediate products and dyestuffs attained its maximum in 1929 with an output of 7,500 and 7,400 metric tons respectively; since when it has declined progressively until 1931, when output fell to 5,400 and 6,500 metric tons respectively. In 1932 there were, however, promising signs of recovery, with an output of 5,700 metric tons of intermediate products and of 6,600 metric tons of dyestuffs, due to increased demand on the home and certain foreign markets. Some 12 firms, owning 15 factories, employing over 1,600 workers, are engaged in these industries.

### Pigments and Paints

Following steadily along the path on which it started many years ago, the Italian mineral pigment and paint industry is making steady progress in the manufacture of first class goods covering the whole range of qualities now in demand.

The marked increase in the output of white lead and oxide of zinc paints noted since the war and until 1928-29, has since then declined heavily for the latter variety, while there has been an increased demand for the more recent lithopone and titanium white paints. Taken as a whole, the Italian pigment and paint industry has enlarged its field of production and now prepares on scientific lines the whole range of cellulose paints and specialities for the most diverse uses. The total output of pigments in 1932 was estimated around 12,000 metric tons, that of paints at 21,300 metric tons. Another branch of the industry specialises in the manufacture of inks, with special attention to printers' ink, for the manufacture of which the Italian factories ahe fully equipped. Nearly 270 factories, employing some 3,500 workers, are engaged in these several lines of production.

The Italian chemical industries now manufacture special media and solvents for cellulose paints and process the raw cotton to meet all industrial requirements thus completing the whole cycle of production.

### Citric Product Industry

Several of the chemical industries dealing with agricultural products are of marked importance. They treat both home products such as citrus fruit, olive oil, tartar of wine, etc., and imported produce such as maize for starch, seed oils, certain barks for tanning extracts, etc. The citric product industries rank first among those treating agricultural products, and in former years were very actively engaged in producing citrate of lime and citric acid from lemon juice, but they now have to meet the competition of similar products obtained by fermentation. This branch of the trade is, however, preparing to make other uses of citrus fruits. Like citric acid, tartaric acid is also now produced in smaller quantities than formerly, the efficiency of the industry has, however, been in no wise impaired. Although the output of ethyl alcohol, obtained mostly from molasses, has somewhat declined (49,751 metric tons in 1929 and 43,150 in 1932) it has recently acquired a new outlet, being now legally recognised as one of the ingredients of alcohol-petrol carburating mixture.

### Vegetable and Essential Oils

The industries extracting essential oils from citrus fruit, aromatic herbs and flowers have great opportunities for development in Italy where their raw materials grow in abundance. It is therefore only natural that the Italian perfumery industry, whose products, like many of those made by foreign firms, are obtained from Italian raw material, is winning a place for itself on the market. This group of industries is carried on by more than 500 firms, owning 520 factories, and employing some 6,000 workers.

Vegetable oils are another branch of production which has attained marked importance in Italy. If we leave out of account the oil-pressing industry, which cannot properly be described as chemical, all the other oil processing trades turning out refined olive oil, sulphated olive oil obtained from the olive mush by treating it with solvents, and seed oils are the produce of important industries which have shown marked growth in recent years. The total annual output of seed oils exceeds 100,000 metric tons; 90,000 metric tons of refined olive oil were produced in 1930 and 63,000 metric tons in 1932; 26,000 metric tons of sulphated olive oil were obtained in 1931 and 21,000 tons in 1932. Nearly 300 plants, employing some 6,000 workers, are engaged in these industries.

### Tanning Extracts

Tanning extracts with a 30 per cent. tanning content, obtained from Italian chestnut wood, and the dry extract obobtained from the Argentine quebracho, were produced in Italian factories in quantities amounting to 68,000 metric tons in 1930 and 56,050 tons in 1932. Some 30 firms owning over 40 plants and employing more than 1,000 workers are engaged in this business. Mention must also be made of the starch, fecula, glucose, dextrine, and cold paste industries. There is an annual output of some 13,000 metric tons of rice obtained from maize, and of over 3,500 metric tons of rice starch; the output of liquid glucose rose to 11,400 metric tons in 1929 and stood at 8,556 in 1932. These industries are carried on in some twenty factories employing over 500 workers.

## Japan as a Production Centre

### Chemical Industry Expands

THE development in Japan of all sections of industry continues apace, and the time has long since passed when orders for manufactured articles placed by Japanese firms were abundant in this country. In many classes of goods, Japanese manufacturers can supply the home market, and in some cases are even able to cut in successfully on foreign markets which had hitherto been regarded the monopoly of European and American exporters. This turning of the tables applies as much to the chemical industry as any other, and the following brief notes from a correspondent in Yokohama may serve as some indication of the manner in which the Japanese chemical industry is developing.

Difficulties are being experienced in obtaining sufficient quantities of soda ash, which owing to the increased production of caustic soda is in wider demand than formerly. Importation from America is rendered almost impossible, as two sources of supply on the Pacific Coast have ceased operations, and the cost of transport stands in the way of adequate supplies from the Eastern states, as well as from Europe. Recently, however, supplies of caustic soda from Soviet Russia have reached the market via Dairen, and shipments from America are reported to have arrived during July.

The production of glycerine has increased sufficiently for the domestic market to be supplied without importing, and it is hoped that in the near future exportation will be possible. Co-operation among the various manufacturers is being sought to this effect.

### Ferro-Manganese

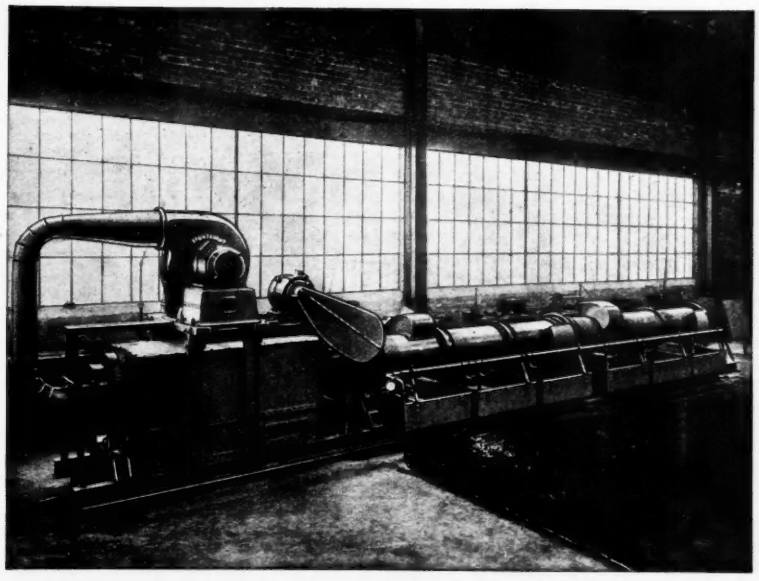
The Chichibu Electro-Industrial Co. have extended their works with a view to processing manganese and low carbon ferro-manganese. Manganese has hitherto been imported from Germany and England, and arrangements are being made for an annual production to equal that handled by the importers. It is hoped to export small quantities to America and France. The production of low carbon ferro-manganese will, it is stated, be a great step forward for the Japanese electro-chemical industry.

Fears of a glut of acetic acid on the market have been caused by the announcement recently made by the Japan Iodine Co., Ltd., that they intend marketing this product. The demand is already more than satisfied by Mitsui Bussan Kaisha and the Japan Nitrogenous Manure Co., and these two concerns have been considering an attempt to enter the Chinese market. If, however, the enterprise of the Iodine Co. would increase production sufficiently to make exportation easier, obviously there need be no fear of an excessive stock in the home market.

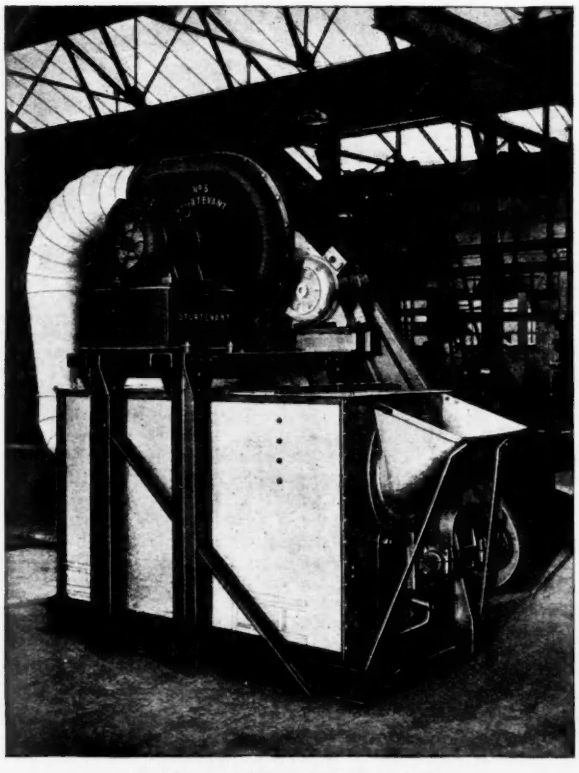
# Washing and Drying for Small Metal Parts

IN the metal trades there are many small parts which have to be degreased, washed and dried between manufacturing operations. The Sturtevant machine illustrated on this page not only degreases, washes and dries—but also speeds up production, and being entirely automatic it reduces labour costs and economises in space.

This machine comprises degreasing, washing and drying sections, the metal parts being dumped into the hopper shown on the right in the general view, from which they are fed at an even rate into a rotary cylinder built of perforated plate. Here the parts are slowly conveyed along the revolving cylinder by a spiral impeller, and in passing through the perforated portion they are degreased by washing with suitable solutions which are scooped up from tanks below, and poured in quantities on to the parts passing through the machine. This same operation is repeated as the parts travel through the rinsing chamber where hot water is poured over them, before they pass on to the drying compartment. Here they are subjected to a forced draught of heated air, which ensures that every article is thoroughly dry before leaving the cylinder. The drying chamber is heated by steam at a pressure varying from 60 to 80 lb per sq. in. and when dried the parts are delivered automatically from the drying chamber into storage bins.

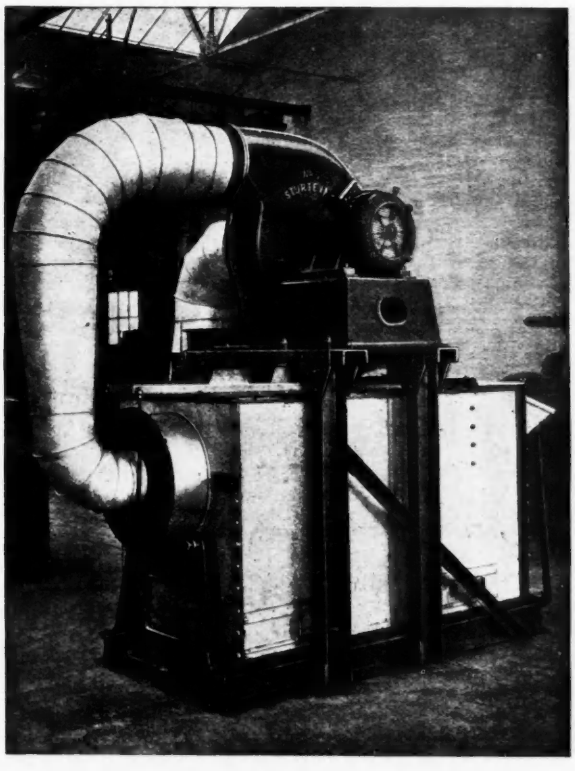


General View of Sturtevant Washing and Drying Machine.



Feed End of Self-Contained Drying Section.

When it is necessary to dry metal parts in cases where a washing unit is not employed, a smaller machine, built on similar lines, is obtainable. In this case the wet parts are tipped into the receiving hopper shown on the right in the view of the feed end of this machine, and are conveyed forward through a drying chamber by a helix within the cylinder. The first part of the cylinder acts as a draining division, the moisture which is collected being led to the outside. Such a machine can be fed with different articles in sequence and as they are kept entirely separate by the helix, there is no chance of them becoming mixed within the cylinder. They are delivered through the opening, shown at the discharge end, immediately below the hot air pipe.



Discharge End of Self-Contained Drying Section.

# Developments in Acetate Rayon Delustring

## Recent Patent Literature

QUITE recently a number of new processes have been disclosed for delustring acetate rayon, and whilst all of these are of value to the practical dyer and finisher, a few have an added theoretical interest to the textile technologist. One very interesting delustring process is that of Courtaulds (Eng. Pat. 388,520), and this, taken in conjunction with a recent process of the Bleachers' Association (Eng. Pat. 394,332), suggests lines of development by which it might be possible to render cellulose acetate rayon (Celanese, Seraceta, Lansil, Rhodiaseta, etc.) capable of being more easily delustred.

According to Courtaulds' process the rayon becomes more easily delustred when it is first treated for a short period in a 2-volume hydrogen peroxide solution, whilst a similar result is achieved in the second method by steeping the rayon in 3 per cent. to 6 per cent. sulphuric acid. These processes must result in at least a slight hydrolysis of the cellulose acetate, that is, a reduction in the average length of the micelle chains. Indeed, viscosity data given in Courtaulds' patent supports this view. For instance, it was found that the viscosities of cellulose acetate rayon before and after the hydrogen peroxide treatment were 1.93 and 0.55 respectively. In this instance the viscosity was measured by the time taken for a steel ball of $\frac{1}{8}$ in. diameter to fall through 20 cms. of a solution containing 6.6 grams of the rayon dissolved in 100 c.c. of acetone.

### Effect of Micelle Chain Structure

An explanation of the manner in which this hydrolysis or degradation of the rayon can influence its delustring properties is probably to be found in the consequent effect on the lateral forces which hold together the cellulose acetate micelle chains. It is now generally accepted that the lustre of a rayon fibre is increased as the micelle chains are arranged more parallel to the length axis of the fibre. In a very lustrous fibre the micelle chains would approach a parallel orientation, whilst in a fully delustred fibre the chains would be displaced and arranged at random. The change from one to the other of these arrangements is usually brought about on the large scale by boiling the rayon in a soap solution to which is frequently added a small amount of phenol as an accelerator.

It is obvious that resistance to delustring in a soap liquor may arise from strong lateral valency forces holding the micelle chains in their relative parallel state or from an applied stretching during the delustring process. As regards the latter effect it is known that stretching of a delustred fibre partially restores its original lustre. Acid and oxidising treatments are also known to decrease the length of the micelle chains, and this, in turn, would diminish the lateral forces. Thus it would appear that any treatment of cellulose acetate rayon which had the effect of slightly degrading it would assist subsequent delustring processes. When rayon is degraded its generally becomes less durable so that considerable care will be necessary to limit the extent of the degradation so that its harmful action is negligible.

It is claimed that the method of Eng. Pat. 388,520 not only renders acetate rayon more easily delustred, but that it affects a difficultly delustrable rayon more than one which can be easily delustred. Thus the process is suitable as a pre-treatment for yarns and fabrics which are known to contain uneven-delustring types of rayon, since it will thus assist to produce an even-delustring in the subsequent soaping treatment.

### Mineral Pigment Delustring Methods

For the process of Eng. Pat. 394,332 is is claimed that the acid treated rayon material may be satisfactorily delustred whilst under tension, and this of course is especially beneficial in cases where delustring is carried out by continuous methods.

A serious disadvantage of cellulose rayon delustred by means of boiling soap is that when hot-ironed it regains a large proportion of its original lustre. On the other hand, delustred rayon obtained by precipitating an insoluble opaque mineral pigment within the individual fibres is not thus affected. For this reason, a considerable amount of attention has been devoted to precipitation delustring methods.

Barium sulphate is a common and suitable delustring pigment. It is formed within the rayon by first impregnating this with a solution of barium chloride and afterwards treating with sulphuric acid or sodium sulphate. In this process it is difficult to avoid precipitation of barium sulphate on the surface of the fibres as well as inside of them, and this loose precipitate causes trouble in the dyeing and finishing operations which follow. According to Eng. Pat. 392,593 surface precipitation can be largely avoided by having present in the second bath a large quantity of a salt, which retards dissolution from the rayon of the salt with which it is already impregnated. Thus, in applying this principle, acetate rayon is first impregnated with barium chloride solution at about 60° C., and is then immersed in a bath of disodium phosphate containing up to 30 per cent. of potassium chloride. In this instance, barium phosphate is precipitated within the rayon for the purpose of reducing its lustre, whilst the potassium chloride prevents the barium chloride dissolving out of the rayon and forming barium phosphate on the surface of the fibres and also in the phosphate bath.

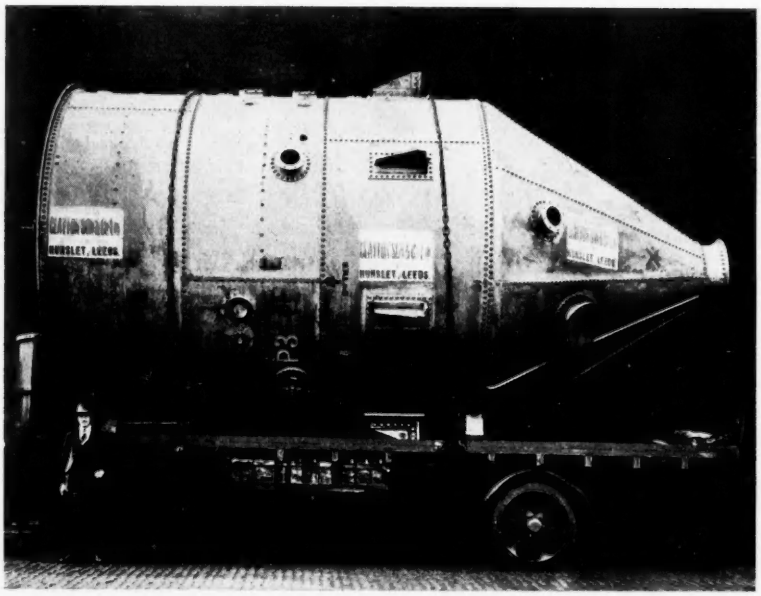
Another method of securing delustring by precipitation is that of Eng. Pat. 391,773 in which cellulose acetate rayon is entered in a bath at 35° C. containing titanium sulphate ($2\frac{1}{2}$ per cent. calculated on the weight of rayon), ammonia ($\frac{3}{4}$ per cent. or just insufficient to cause precipitation of the titanium oxide), a wetting out agent (for example, Gardinol), and 1 per cent. of urea. The temperature of the bath is gradually raised to about 75° C. at which point the urea causes precipitation of titanium oxide within the rayon and reduces its lustre. In Eng. Pat. 391,847, delustring is obtained by immersing the rayon for a short period in a bath, at 95° C., containing a small amount of cetyl or lauryl pyridinium bromide, or other similar quaternary ammonium salt. Under these conditions the rayon rapidly absorbs the rare metal and thereby becomes delustred.

# Research Records

### International Organisation for Chemistry

DURING recent years research has been progressing at such a rapid rate that questions regarding the maintenance of proper records of work done have assumed increasing importance. A step in this direction has now been taken in the field of chemistry by the International Office of Chemistry, created at the international convention in 1932 with headquarters in Paris. Since the establishment of this office a strong committee has been formed which includes F. Donker Duyvis, member of the Council of Patents, The Hague; P. Dutoit, professor, University of Lausanne; F. Haber, director of the Kaiser-Wilhelm Institut für Physikalische Chemie und Electrochemie, Berlin; E. Hauser, Academy of Sciences, Madrid; Ch. Marie, secretary-general of the Comité International des Table Annuelles de Constantes, Paris; N. Paravano, president of the Comitato Nazionale di Chimica, Rome; G. Peny, president of the Federation of Chemical Industries of Belgium, Brussels; and J. C. Philip, professor at the Imperial College of Science and Technology, London.

After careful consideration of the problems associated with the maintenance of scientific and technical records this committee has formulated recommendations determining the functions of the International Office of Chemistry. These are briefly summarised under three principal heads, *viz.*:—(1) To render accessible to all interested persons existing records accumulated in various centres, depots, and collections; (2) to control and give guidance to the preparation of new records, in such a way as will facilitate registering, filing, and diffusion; adopting methods which experience indicates to be the best; (3) to ensures co-ordination between the records relative to chemistry, and that concerning other scientific information in the field of international records.



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# Raw Materials from the Dominions

## The Work of the Imperial Institute

THE latest number of the "Bulletin of the Imperial Institute" contains the usual features on which its high reputation as a conveyor of useful information rests. Among these is an extensive review of a report issued by the Forest Department of the Federated Malay States on "The Damars of the Malay Peninsula," which deals with the botanical resins of Malaya, the method of collecting and treating the different species, and the difficulties associated with a full exploitation of the product.

Publications by the Institute on mineral resources, notes on soil surveys, and a report of investigations carried out on ground-units from South and East Africa are also included in this issue, while a large section is devoted to the indispensable bibliography of reports on plant and animal products, and the equally useful notices of recent literature.

### Goat Skin Dyeing in Nigeria

The previos issue of the bulletin contained, besides all the usual features and other special reports, a description of the process to which Nigerian sheep and goat skins are subjected before being shipped abroad. This treatment, of which a description follows, is carried out entirely by the natives. In recent years it has been found that Nigerian crust leather from goat and sheep skins is of great value from the bookbinding point of view, owing to the property it has of resisting the deteriorating effect of sulphuric acid absorption which occurs in all large smoky towns.

The skins are usually dyed red or yellow with local vegetable dyes, green or magenta with imported dyes, or blue with a mixture of the latter two. For red dye the stalks of "karan dafi"—sorghum—are dried and pounded into a powder and mixed with the supernatant fluid of the ash and "katsi" mixture. The skin, after being pounded, is gently swilled through the dye for about 15 minutes and then squeezed and washed in water. A solution of "lime-water" is made up by placing four small green limes in about a pint and a half of water in a mortar, pounding it, and removing the rinds. For yellow the dried roots of a local plant, "Gangamau," are powdered and a handful of the powdered root is placed on the skin and "lime-water" poured on to the powder. The grain side is rubbed over with this mixture until the required tint is obtained.

Green crystals can be obtained from traders in the markets of Kano. About 2 grams of the crystal are dissolved in lime-water. This solution is ladled on to the flattened skin and well rubbed in by hand. Magenta is also obtained as a crystal dye, the treatment being similar to green dyeing, except that the lime-water is heated and while warm the crystals are added, and the whole solution kept warm while being used.

### Soil Research in British Guiana

The Institute has received a report regarding research on soils and manures recently carried out by the Department of Agriculture.

Sugar-cane soils of British Guiana consist of two main types, the front land clay (an acidic clay topsoil, overlying a less acidic saline clay subsoil) and the pegasse (a highly acidic topsoil, containing considerable quantities of organic matter of wide carbon-nitrogen ratio, overlying a highly acidic clay subsoil). It has been the practice in recent years to flood-fallow the discarded lands for some six months before replanting. The resultant increases in crop are very marked in the plant canes, but gradually disappear with succeeding ratoon crops. Laboratory work suggests that factors among those causing improvement are that the soil content of ammonia increases consequent on waterlogging, that considerable quantities of toxic soluble salts are removed from the upper layers of the soil, and that the interaction of the flooding water, containing small amounts of lime, with the sodium clay subsoil causes an improvement in soil texture. The majority of soil samples are acid in reaction, which is of interest as Sir John Harrison, in 1909, described the same soils as alkaline. Marked changes in reaction have taken place in the colony's cane soils during the last twenty-three years. The manurial practice of the colony consequently requires overhauling. Field experiments in progress indicate response to dressings of ground limestone and suggests that the varied soil types possess differing nitrogen requirements.

### Palm Oil and Shea Fat

As regards Gold Coast palm oil and shea, operations continued at the Butre Palm Oil Factory, but it is stated that for the period January-June, 1932, low prices for oil and kernals rendered profit-earning impossible. The mill was able to pay its way, however, this being made possible by selling oil locally for culinary purposes. The report also records that trials in the making of shea fat were continued at the small mill erected by the Department of Agriculture at Tamale. The working cost of extracted fat was found to be from £20 10s. to £23 10s. per ton, figures which do not include the cost of European supervision or depreciation on plant. Tests show that by effecting certain alterations and additions to the mill, the maximum output would be 120 tons of fat per year, of 300 working days. While it is unlikely that shea fat extraction will be found profitable, except for local demand, the experimental mill will be maintained and further tests carried out.

# Chemical Specialities

### New Association in the United States

A NATIONAL Association of Chemical Speciality Manufacturers has been formed in the United States as a non-profit membership association to provide for firms in that general industry under the National Industrial Recovery Act. At a meeting of representatives of various phases of the industry it was agreed that, while the field of manufacture is a broad one, there is such close community of interest that it should be represented as a unit. Those present foresaw the further complication that a manufacturer producing, as an example, automobile polish, abrasive cleaners and shoe polish would, if there were not a general association in the field, come under more than one code, with resulting complication. Similarly a manufacturer selling to grocers, hardware stores and garages would come under more than one code if his trade association affiliations were according to the type of sales outlet instead of according to the basic matter of type of manufacture. The National Recovery Administration confirmed the opinion that there was no association organised to represent the field as a whole and asked that one be organised.

The plan has the approval of and sponsorship of many firms of importance in the field. A general code for the industry has been drafted by a committee and copies are available for firms interested. It is hoped to have the general code approved and in effect early this month, with sub-codes for many divisions of the field such as alkaline cleansers, cleaning solvents, plumbing specialities, household ammonia, furniture polish, automobile polish, metal polish, soap specialities, wax products, adhesives, inks, shoe specialities, greases and special lubricants, miscellaneous automotive specialities and miscellaneous household specialities to follow as rapidly as possible. The sub-codes include provisions to take into account conditions peculiar to the manufacture and distribution of each group. A member of the association may belong to as many of these groups as apply to the products he manufactures. Such additional sub-groups will be formed as are indicated to be desirable. An outline of the purposes and a copy of the general code can be obtained from the Association, 305 Washington Street, Brooklyn, N.Y.

IT is reported that the Director of Industries in Bombay has given some consideration to the possibility of manufacturing thorium nitrate in India. There is an ample supply of raw material in the form of monazite sand deposits in Travancore on the Malabar coast, but it is doubtful whether a sufficient demand exists to warrant the establishment of a complex processing plant.

# Liquid Fuel Production

## Prospects for Gasworks and Coke-Oven Plants

WITH the stimulus to production of liquid fuel from coal which is given by recent Government measures, interest attaches to a review of the possible rôle which may be played by gasworks in this sphere, as contributed to the "Chemiker-Zeitung," August 23, 1933, by Dr. F. Schuster.

Direct liquefaction of coal by the Bergius process of high pressure hydrogenation is, of course, fundamentally divergent from any of the operations involved in gasworks and coke oven practice. In the light, moreover, of the immense cost of hydrogenation plants as revealed by development work in other quarters, none but the largest gas companies are likely to contemplate entry into this field. Coming then to the alternative processes for liquid fuel production which offer economic success to gasworks, a prominent place must be accorded to those utilising coal tar and the aromatic hydrocarbons derived therefrom. Here it must not be overlooked that although tar itself can be converted into low boiling hydrocarbons by hydrogenation and cracking, the products do not differ in properties to any marked extent from the aromatic hydrocarbons isolated by direct methods. On carrying out the cracking process in the presence of water vapour, however, the possibility presents itself of splitting up the tar into water gas which forms the starting point for the production of other liquid fuels. Significance will only be achieved by this round-about process in exceptional cases, since direct hydrogenation of tar or direct production of water gas from the coal itself leads to the same end-products in a less complicated manner.

### Favourable Position of Coke-Oven Plants

Gas which has been scrubbed free of benzol is an important potential raw material for the production of other liquid fuels. Coal-gas can be chemically converted into water-gas (essentially a mixture of carbon monoxide and hydrogen), catalytic treatment of which (under suitable pressures and temperatures) may lead to the formation of petroleum-like hydrocarbons, oxygen-containing fuel oils, or methyl alcohol. Of these alternatives, that involving conversion to petroleum-like products is the most suitable for gasworks owing to the possibility of working at ordinary pressure. Coke-oven plants which are already running a synthetic ammonia unit are, of course, in a far more favourable position to adopt a high pressure process of liquid fuel production. Catalytic conversion of water-gas into hydrocarbons calls for thorough elimination of sulphur compounds and a large number of special processes having been devised to this end.

Synthetic ammonia plants run on the Linde-Brown-Concordia system, involving high pressure and separation of the reaction products by intense cooling or liquefaction, yield by-products which may well be utilised for liquid fuel production. Methane and homologues, ethylene and (to a slight extent) acetylene, here enter into consideraton. Methane hydrocarbons are convertible into water-gas, benzol or formaldehyde, while ethylene and acetylene may serve as raw materials for hydrocarbon oils or alcohol.

Water-gas and methane are the two products of coal treatment in gasworks and coke-oven plants which are likely to hold the stage in future schemes of liquid fuel production. Attention is also drawn in conclusion to the possibilities of the Audry-Bourgeois-Olivier process which comprises (1) manufacture of water gas from coke; (2) conversion to methane by catalytic treatment; (3) fission of methane to acetylene by electrothermal action; and (4) condensation and polymerisation of acetylene to hydrocarbon liquids.

# New Nitrate Scheme

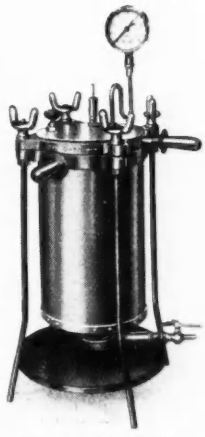
## A Sales Corporation Board

ACCORDING to reports from Santiago (Chile), the Financial Commission of the Chamber has finished its study of the new scheme for the sale of nitrate. The head sales office is to be established at Valparaiso, and all operations undertaken by this office will be free of taxation. On the board of administration there will be five representatives of the Cosach Liquidation Committee, one representative of the independent nitrate companies, and three Government representatives.

# A New Laboratory Steriliser

## Exact Degree of Pressure Maintained

THE "Alembic" steriliser, shown in the accompanying illustration, has been designed to meet the new British Pharmacopœia 1932 regulations. It is 6 in. in diameter by 10 in. deep, and is made by Brown and Son (Alembic Works), Ltd., who are specialists in the manufacture of autoclaves, sterilisers and laboratory equipment. It is constructed of hard drawn copper with gun metal cover and fittings, and is provided with an internal loose basket. Constructed for a steam working pressure of 10 lb. per sq. in., this steriliser is guaranteed tested to 100 per cent. overload. Fittings include pressure gauge, safety valve, and steam release tap. The gas burner has an adjustable stop and is of novel design. By turning the tap one way the gas is lowered to exactly maintain a pressure of 10 lb. per sq. in. within; gas is shut off by turning the tap in the opposite direction. The cover is opened by a simple quarter turn to the right, after loosening the clamp nuts, and the nuts need not be entirely removed for this operation. Such a steriliser will find many useful applications in analytical laboratories.



The Alembic Steriliser.

# Coal Hydrocarbons

## A Study of Thermal Decomposition

EVIDENCE is being presented in a paper before the Division of Petroleum Chemistry, of the American Chemical Society, at their meeting at Chicago, September 10-15, to show that coals from the peat stage through the higher ranks contain as an essential part of their structure six-membered carbon rings similar to those present in aromatic compounds and graphite. The author, H. H. Lowry, will point out that coal is not a hydrocarbon and contains little, if any, free hydrocarbon. Consideration of the nature of the products obtained from coal with increasing severity of thermal treatment, suggests that the aromatics found in coal tar result primarily from dehydrogenation and decarboxylation of depolymerised nuclei present in the original coal. Finally data will be presented which support the idea that "free" carbon in pitch, coke, and charcoal may be regarded as highly polymerized aromatic hydrocarbons which gradually and regularly approach graphite as the temperature at which they are formed increases.

# The "Independent"

## A New Departure in Weekly Reviews

THE first number of "The Independent," the new weekly newspaper of liberty, economy and individualism, which is to be published from Bouverie House by Independent Weekly Publications, Ltd., will make its appearance on October 7. "The Independent," which is to be of the same page size as THE CHEMICAL AGE, is being launched as an anti-political journal and hopes to serve and help those citizens who feel that there are higher forms of citizenship than the present mania for meddling in everybody's affairs. A new circular issued this week gives a programme of contents of a typical week's issue, revealing considerable departures from the usual character of weekly reviews. Besides special articles (signed and anonymous), court and parliamentary news, correspondence and reviews of books and literary doings, "The Independent" will include a picture page by its own staff photographer, a children's page, the sermon of the week, a crossword and sections on radio, the stage, the screen, travel and motoring.

Already a large number of influential people have given their support to the undertaking by entering as foundation subscribers, and the list, which is growing daily, has already set a new record in periodical publication.

# News from the Allied Industries

## Paint and Varnish

PINCHIN, JOHNSON AND CO. have declared an interim distribution on the ordinary shares of 6 per cent.; this compares with 7½ per cent. a year ago. For the whole of 1931 the dividend was 17½ per cent., against 22½ per cent. for 1930, and a large reduction in profits was shown. Accompanying the interim dividend now declared is a brief statement to the effect that sales for the six months ended June 30 last show a substantial increase both in tonnage and total money value, while net trading profits also show a satisfactory increase.

## Textiles

THE LANCASHIRE TEXTILE TRADE DELEGATION, which is going to Simla to be present during trade discussion between India and Japan, left England on August 25. It is headed by Sir William Clare Lees, and includes Mr. S. S. Hammersley, M.P., and representatives of the Silk Association of Great Britain. The delegation will not take part in the discussions. The Indian Government, however, will receive the Lancashire representatives and listen to their views on the participation of India, Britain and Japan in the Indian market. This Indian conference will be followed by discussions in Britain between British and Japanese industrial representatives, and it is expected that preliminary informal talks will begin early next month.

## Mineral Oil

UNDER THE COMPULSORY LIQUIDATION of the Venezuelan Consolidated Oilfields, Ltd., a special meeting of the creditors and shareholders was held on August 28, at the Board of Trade Offices, London, before Mr. George W. Hutcheson, the Assistant Official Receiver. The chairman reported that the meeting was called under somewhat unusual circumstances. The Official Receiver had been approached, he said, by the Standard Oil Co. of Venezuela, with a view to purchasing this company's interest in the Concession in Venezuela. He had now received an offer of £5,000 for the whole of the company's equitable interest in (1) a concession granted by the Venezuelan Government for the exploitation and exploration of hydrocarbons covering a marine strip known as the Orinoco Delta Concession, and (2) in 99,500 shares in the Siparia Trinidad Oilfields, Ltd., at present in the possession of the Receiver for debenture-holders of the company as part of their security. A resolution authorising the Official Receiver to accept the offer was unanimously passed by the creditors and by a majority of the shareholders.

## Rubber

THE VOLUNTARY LIQUIDATION of nine companies in the Dunlop group, announced in the "London Gazette," is the result of the concentration of Dunlop manufactures into four major divisions, apart from the main business of tyres and accessories. The companies are Liverpool Rubber Co., Ltd., Broadhurst and Co., Ltd., Dela Rubber Co., Ltd., Macinlop, Ltd., Macinlop (Ireland), Ltd., Macinlop (S. Africa), Ltd., Dunlop Sports Co., Ltd., Tyre Machinery Syndicate, Ltd., and Shrewsbury and Challiner Tyre.Co., Ltd. The whole of the business of these companies is now being directly carried on by the Dunlop Rubber Co.

IN CONNECTION WITH the rubber restriction discussions, the "Agence Economique et Financière" understands from a well-informed source that the British and Dutch Governments are considering the scheme prepared by a committee representative of producing interests. Although Government officials have refrained from making any comment on the subject it is thought that the scheme will not encounter any official opposition. On the other hand, "De Telegraaf," states that the discussions that have been proceeding during the past few weeks are likely to continue, as there are still a number of difficulties to be overcome.

A LARGE RUBBER FACTORY at Burton-on-Trent, which has been closed for two years, has been taken over by the Goodrich Rubber Co.

## Asbestos

A SCHEME OF RECONSTRUCTION has been submitted by the Mashaba Rhodesian Asbestos Co., which will enable the undertaking to re-enter into possession of its properties and provide capital for the resumption of operations. As part of the scheme it is proposed to write down the existing 600,000 shares of 5s. each to shares of 3s. each and to sub-divide the new shares in shares of 1s. each.

## Carbonisation

THE NEW PLANT of British Coal Refining Processes, Ltd., at Lepton, near Huddersfield, is hoped to be completed by the end of October or the beginning of November, so that production from it may be started before the close of the year. Low Temperature Carbonisation, Ltd., contemplate the erection of further works as rapidly as possible in the belief that this step is imperative, in view of the national demand for smokeless fuel, combined with the recent Government promise of support for home-produced fuel oil and petrol.

## Artificial Silk

A NEW COMPANY, Crepe Yarns, Ltd., has been formed for the purpose of operating the viscose crepe section of the factory of Alliance Artificial Silk, Ltd. Shareholders of Alliance Artificial Silk are being offered, for every five shares held, one 5s. share in Crepe Yarns, credited with 2s. 6d. paid up, 6d. of the remaining 2s. 6d. payable on application, 1s. on allotment, and 1s. one month after allotment. The new company's capitalisation will be £125,000, in five shilling shares.

THE PROVISION OF FURTHER CAPITAL to meet the debenture charge held by the Alliance Assurance Co. was the main subject of discussion between the directors and the shareholders of the Branston Artificial Silk Co. at the annual meeting held on August 28. Mr. Percy A. J. Hammett, who presided, said that the debenture and interest accrued of £57,786 was responsible for the immediate difficulties of the company. The pressing and immediate concern of the directors was to free the company from the receivership. If that were accomplished, and production resumed, the shareholders could consider the reorganisation of the capital in the light of the potential earning capacity of the plant. The debenture deed embodied a condition that the debenture-holders could take possession of their security upon the cessation of production, and this they had done in February, 1931. Since that period, the new board had abandoned a reconstruction scheme following upon the pleadings of many small shareholders that they would be quite unable to meet their assessment calls. Courtaulds had ultimately made an offer of £115,000 for the undertaking but, being convinced that the true value was far in excess of that sum, the Branston directors had refused to associate themselves in any way with the acceptance of that offer. The Branston directors, however, had now invited the shareholders to subscribe for notes and to purchase Kirklees shares. On the proposal of Colonel Hamlett, the directors were requested to approach the Alliance Assurance Company, with a view to securing more time for the company to get the necessary funds to pay off the debenture.

## Carbon Black Substitutes in Germany

GERMANY consumes annually large quantities of carbon black for use in manufacture of rubber products, and this demand stimulated German interests to develop a process for manufacture of a black pigment of equal value from the materials available in the country. The domestic lampblack industry is an important one, but the product has only a limited range of uses and recent research work was directed toward gas as a starting point instead of liquid fuels used in the manufacture of lampblacks. As far as scientific and technical possibilities are concerned, carbon black was produced satisfactorily on a small scale and its quality was reported favourably by many industries. From the commercial standpoint, the methods were too costly and further attempts were discontinued.

# Inventions in the Chemical Industry

## Specifications Accepted and Applications for Patents

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

### Specifications Accepted with Dates of Application

OILS OBTAINED FROM RUBBER.—H. Plauson. Nov. 8, 1930. 397,136.

OXIDATION OF OLEFINES.—H. Dreyfus. Dec. 3, 1931. 397,161.

APPARATUS FOR THE RECOVERY BY ADSORPTION OF GASES, VAPOURS, OR LIQUIDS.—E. R. Suteliffe. Dec. 8, 1931. 397,128.

MANUFACTURE OF CELLULOSE DERIVATIVES.—H. Dreyfus. Feb. 12, 1932. 397,116.

CELLULOSE DERIVATIVES AND THEIR MANUFACTURE.—H. Dreyfus. Feb. 12, 1932. 397,117.

SEPARATION OF PARAFFIN WAX OR SIMILAR WAXY SUBSTANCES FROM OILS CONTAINING THE SAME.—J. Y. Johnson (I. G. Farbenindustrie). Feb. 13, 1932. 397,169.

MANUFACTURE OF AROMATIC ALDEHYDES.—Imperial Chemical Industries, Ltd., and L. E. Hinkel. Feb. 15, 1932. 397,124.

ISOLATION OF *p*-XYLENOL FROM PHENOLIC MIXTURES.—G. T. Morgan and A. E. J. Pettet. Feb. 18, 1932. 397,148.

HYDRATION OF OLEFINES.—H. Dreyfus. Feb. 20, 1932. 397,187.

MANUFACTURE OF OPTICALLY-ACTIVE MENTHOLS.—Howards and Sons, Ltd., J. Read and W. J. Grubb. March 4, 1932. 397,212.

PRODUCTION OF ORGANIC SALTS OF BISMUTH.—Boot's Pure Drug Co., Ltd., F. L. Pyman and A. P. T. Easson. April 26, 1932. 397,249.

PRODUCTION OF ARTIFICIAL SILK.—H. W. K. Jennings (Glanzstoff-Courtaulds Ges.). May 2, 1932. 397,253.

PRODUCTION OF AMMONIUM SULPHATE.—Appareils et Evaporateurs Kestner. June 10, 1931. 397,271.

PRODUCTION OF DRIERS OF IMPROVED STABILITY AND SOLUBILITY. I. G. Farbenindustrie. July 17, 1931. 397,276.

SEPARATION OF IRON AND ALUMINIUM OXIDES.—J. G. Stein and Co., Ltd., J. F. Hyslop and R. Mackenzie. July 11, 1932. 397,288.

MANUFACTURE OF SODIUM NITRATE AND AMMONIUM CHLORIDE.—Dr. W. Steudeman. July 28, 1931. 397,290.

PROCESS FOR THE MANUFACTURE OF COMPLEX DOUBLE COMPOUNDS OF THIO-SUBSTITUTED CARBOHYDRATES.—Schering-Kahlbaum Akt.-Ges. Aug. 3, 1931. 397,293.

CATALYSTS.—W. W. Hyddleton. July 26, 1932. 397,295.

ELECTROLYZERS FOR THE MANUFACTURE OF CHLORINE AND ALKALINE HYDRATES.—C. Pouyard. Aug. 11, 1931. 397,300.

PROCESS FOR DEHYDRATING OR WETTING AQUEOUS SUBSTANCES WITH ORGANIC LIQUIDS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Oct. 23, 1931. 397,309.

PROCESS FOR PRODUCING A PERMANENT SUSPENSION OF OIL IN WATER.—C. F. Fitts. Oct. 1, 1932. 397,317.

PROCESS FOR DECAFFEINISING COFFEE AND DETHEINISING TEA EXTRACTS.—Dr. C. Massatsch. Oct. 15, 1932. 397,323.

PROCESSES OF POLYMERISING VINYL COMPOUNDS.—Carbide and Carbon Chemicals Corporation. Jan. 29, 1932. 397,364.

PRODUCTION OF CATALYSTS.—S.I.R.I. Soc. Italiana Ricerche Industriali. Feb. 23, 1932. 397,369.

MANUFACTURE OF AMINOANTHRAQUINONESULPHOCHLORIDES.—I. G. Farbenindustrie. Feb. 22, 1932. 397,190.

METHOD OF MANUFACTURING SULPHATE OF ALUMINA.—Kalunite Co. April 23, 1932. 397,407.

METHOD OF MANUFACTURING BASIC ALUM.—Kalnuite Co. April 22, 1932. 397,408; 397,410.

METHOD OF MANUFACTURING ALUMINA.—Kalunite Co. April 22, 1932. 397,409; 397,411.

METHOD OF ELIMINATING IRON FROM SULPHATE SOLUTIONS.—Kalunite Co. April 22, 1932. 397,412.

PRODUCTION OF RUBBER THREAD.—International Latex Processes Ltd. April 16, 1932. 397,419.

MAGNESIUM-BASE ALLOYS.—W. J. Tennant (Dow Chemical Co.). April 8, 1933. 397,427.

CRYSTALLISERS.—Mirrlees Watson Co., Ltd., (R. Pitcairn). April 27, 1933. 397,432.

PREPARATION OF CHROMATES AND DICHROMATES.—Bozel-Maletra Soc. Industrielle De Produits Chimiques. May 26, 1932. 397,434.

PREPARATION OF MONOCHROMATES AND DICHROMATES.—Bozel-Maletra Soc. Industrielle De Produits Chimiques. May 26, 1932. 397,435.

MANUFACTURE OF PRODUCTS CONTAINING CELLULOSE DERIVATIVES. H. Dreyfus. Nov. 19, 1931. 397,191.

MANUFACTURE OF HIGH MOLECULAR ORGANIC THIOSULPHATES.—Henkel et Cie, Ges. Jan. 4, 1932. 397,445.

### Applications for Patents

LIGHT-SENSITIVE PHOTOGRAPHIC MATERIAL.—I. G. Farbenindustrie. Aug. 10. (Germany, Aug. 10, '32.) 22376 and 22377.

MANUFACTURE OF CHLORINATED RUBBER.—Imperial Chemical Industries, Ltd., J. A. M. W. Mitchell, and W. D. Spencer. Aug. 11. 22455.

RECOVERY OF SULPHUR FROM MASSES USED FOR PURIFYING GASES. J. Y. Johnson (I. G. Farbenindustrie Akt.-Ges.). Aug. 11. 22462.

MANUFACTURE OF HIGHLY-VISCOUS OILS.—J. Y. Johnson. Aug. 11. 22463.

PRODUCTION OF TRICARBOCYANINE DYES.—J. D. Kendall. Aug. 12. 22572 and 22573.

MAKING TITANIUM WHITE.—Metal & Thermit Corporation. Aug. 11. (United States, Sept. 9, '32.) 22475.

COLOURING SURFACE OF UNGLAZED FIRED BRICKS, ETC.—A. L. Mond (I. G. Farbenindustrie Akt.-Ges.) Aug. 10. 22378.

EVAPORATING, CONCENTRATING, AND DISTILLING PROCESS.—Soc. of Chemical Industry in Basle. Aug. 11. (Switzerland, Aug. 12, '32.) 22461.

MANUFACTURE OF CARBON PAPERS.—M. Bandli. Aug. 15. (Germany, Aug. 16, '32). 22828 and 22829.

INTERMEDIATES FOR DYESTUFFS.—E. G. Beckett and Imperial Chemical Industries, Ltd. Aug. 18. 23125.

MANUFACTURE OF PRODUCTS FROM CELLULOSE ESTERS.—C. F. Boehringer and Soehne. Aug. 15. (Germany, Aug. 20, '32.) 22815.

MANUFACTURE OF ANTHRAQUINONE DERIVATIVES.—E. Burgoine. Aug. 16. 22876.

PREPARATION OF METALLIC BERYLLIUM.—Calloy, Ltd., and G. N. Kirsebom. Aug. 15. 22821.

MANUFACTURE OF HALOGENATED VAT DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie). Aug. 15. 22812.

MANUFACTURE OF OIL-GAS.—H. E. Coley. Aug. 19. 23143.

PRODUCTION OF VOLATILE COMPOUNDS.—H. Dreyfus. Aug. 15. 22773.

PRODUCTION OF ORGANIC COMPOUNDS.—H. Dreyfus. Aug. 15. 22774.

CATALYST COMPOSITIONS.—E. I. Du Pont de Namours and Co. Aug. 18. (United States, Aug. 18, 32.) 23133.

REFINING MAGNESIUM, ETC.—I. G. Farbenindustrie. Aug. 17. (Germany, Nov. 5, '32.) 23000.

MANUFACTURE OF SODIUM AND POTASSIUM DICHROMATES.—I. G. Farbenindustrie. Aug. 18. (Germany, Sept. 17, '32.) 23103.

PREPARATION, ETC., OF CATALYSTS FOR HYDROGENATION OF CARBONACEOUS MATERIALS.—C. Imeretinsky and E. R. W. de Mahler. Aug. 15. 22826.

MANUFACTURE OF ANTHRAQUINONE DERIVATIVES.—Imperial Chemical Industries, Ltd., Aug. 16. 22876.

MANUFACTURE OF MAGNESIA DEFICIENT IN LIME, ETC.—Klöckner-Werke A.G. Aug. 17. (Germany, Sept. 2, '32.) 22995.

PURIFICATION OF LIQUIDS FOR CATALYTIC HYDROGENATION.—E. B. Maxted. Aug. 17. 22950.

TREATMENT OF HYDROCARBON OILS AND SOLID BITUMINOUS MATERIAL.—A. L. Mond (Universal Oil Products C.). Aug. 18. 23064.

### Complete Specifications Open to Public Inspection

MANUFACTURE OF CHROMIFEROUS DYESTUFFS.—Soc. of Chemical Industry in Basle. Feb. 20, 1932. 5181/32.

MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. Feb. 15, 1932. 32992/32.

PROCESS FOR THE PRODUCTION OF DERIVATIVES OF ALBUMIN CLEAVAGE PRODUCTS.—Chemische Fabrik Grünau Landshoff and Meyer Akt.-Ges. Feb. 16, 1932. 1242/33.

PROCESSES FOR THE MANUFACTURE OF HIGH MOLECULAR SULPHIDES OF THE ALIPHATIC SERIES.—Henkel et Cie. Ges. Feb. 19, 1932. 1412-3/33.

PROCESSES FOR WORKING-UP PITCH, TAR, ACID RESIDUES, AND OTHER COMBUSTIBLE SUBSTANCES.—Pape and Co., Ges. Feb. 16, 1932. 4388/33.

PREPARATION OF EDIBLE FATS.—B. Behrend. Feb. 20, 1932. 4660/33.

PROCESS OF AND MEANS FOR DEHYDRATING COLLOID MATERIAL.—M. Van Roggen and L. Robin. Feb. 18, 1932. 4678/33.

MANUFACTURE OF DYESTUFFS.—Soc. of Chemical Industry in Basle. Feb. 18, 1932. 4786/33.

PROCESS OF HARDENING GELATIN.—I. G. Farbenindustrie. Feb. 16, 1932. 4788/33.

MANUFACTURE AND USE OF PRODUCTS SUITABLE FOR USE AS WASHING, WETTING-OUT, EMULSIFYING, DISPERSING, FOAMING, CLEANSING, AND LIKE AGENTS.—Deutsche Hydrierwerke Akt.-Ges. Feb. 17, 1932. 4823/33.

MANUFACTURE OF DYESTUFFS AND INTERMEDIATE PRODUCTS THEREFOR.—Soc. of Chemical Industry in Basle. Feb. 13, 1932. 4973/33.

# Weekly Prices of British Chemical Products

## Review of Current Market Conditions

THE following market report is based on information supplied by the British manufacturers concerned, and unless otherwise qualified the figures quoted apply to fair quantities, net and naked at makers' works. Where no locality is indicated, the prices are general for the United Kingdom. Particulars of the London chemical market are specially supplied to THE CHEMICAL AGE by R. W. Greeff and Co., Ltd., and Chas. Page and Co., Ltd., and those of the Scottish chemical market by Chas. Tennant and Co., Ltd.

PRICES remain firm generally and the improved demand continues. The market for coal tar products is steady, and prices are unaltered. In the nitrogen fertiliser market it is reported that with the exception of supplies being taken by fertiliser mixers there is very little interest in sulphate of ammonia. The prices of other fertilisers remain unchanged, and apart from fairly substantial forward bookings for nitro-chalk there is little interest at the moment. Chemical products on the Manchester market during the past week have maintained a remarkably steady tone and alterations on balance have been of minor importance. The holiday season has now about passed its height and interruptions of deliveries this week have been somewhat less pronounced than during the earlier works of the month. So far, however, there has not been much improvement in the volume of new business and transactions still tend to be in respect of relatively small quantities. Business generally in the Scottish heavy chemical market has been steady and no change in prices has taken place.

### General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £38 5s. to £40 5s.; pure 80% £39 5s.; tech., 40%, £20 5s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. LONDON: Tech., 80%, £38 5s. to £40 5s.; pure 80%, £39 5s. to £41 5s.; tech., 40%, £20 5s. to £22 5s.; tech., 60%, £29 5s. to £31 5s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech. 80%, £38 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—SCOTLAND: Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s.; B.P. powder, £36 10s. in 1-cwt. bags d/d free Great Britain in 1-ton lots upwards.

ACID CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—LONDON: 9½d. per lb.; less 5%. MANCHESTER: 9½d. to 9¾d.

ACID, CRESYLIC.—97/99%, 1s. 1d. to 1s. 7d. per gal.; 98/100%, 1s. 5d. to 2s.

ACID, FORMIC.—LONDON: £47 10s. per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £48; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 7s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £49 to £52 ex store. MANCHESTER: £48 to £54 ex store.

ACID, SULPHURIC.—Average prices f.o.r. British makers' works, with slight variations owing to local considerations; 140° Tw. crude acid, £3 per ton; 168° Tw. arsenical £5 10s.; 168° Tw. non-arsenical, £6 15s. SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—LONDON: 11d. per lb. SCOTLAND: B.P. crystals, 11d., carriage paid. MANCHESTER: 11¾d.

ALUM.—SCOTLAND: Lump potash, £9 per ton ex store.

ALUMINA SULPHATE.—LONDON: £8 5s. to £9 10s. per ton. SCOTLAND: £8 to £8 10s. ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £32 per ton; powdered, £34, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £19 to £20. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND: Spot, £26 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC.—LONDON: £17 c.i.f. main U.K. ports for imported material; Cornish nominal. £22 10s. f.o.r. mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £23 at mines.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—£11 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot 35/37% £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 15s. in 5/6 cwt. casks.

BORAX, COMMERCIAL.—Granulated, £15 10s. per ton; powder, £17 packed in 1-cwt. bags, carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—2s. 9d. to 3s. 1d.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—3½d. to 4¾d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£41 to £46 per ton, drums extra.

CHROMIUM OXIDE.—10½d. per lb., according to quantity d/d U.K. Green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 3½d. per lb. Liquor, £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—LONDON: £4 per cwt.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £28 per ton. SCOTLAND: 40%, £28 ex store.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £34 per ton; brown, £1 per ton less. SCOTLAND: White crystals, £33 to £35; brown, £1 per ton less. MANCHESTER: White, £31 10s.; brown, £30.

LEAD NITRATE.—£28 per ton.

LEAD, RED.—SCOTLAND: £25 10s. to £28 per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid.

LITHOPONE.—30%, £17 10s. to £18 per ton.

MAGNESITE.—SCOTLAND: Ground Calcined £9 per ton ex store.

METHYLATED SPIRIT.—61 O.P. Industrial 1s. 8d. to 2s. 3d. per gal. Pyridinised Industrial, 1s. 10d. to 2s. 5d. Mineralised, 2s. 9d. to 3s. 3d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NICKEL AMMONIUM SULPHATE.—£49 per ton d/d.

NICKEL SULPHATE.—£49 per ton d/d.

PHENOL.—9d. to 10d. per lb. nominal.

POTASH, CAUSTIC.—LONDON: £42; MANCHESTER: £41 to £42.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5¾d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100% powder, £37. MANCHESTER: £38.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND: Refined Granulated £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8½d. per lb. SCOTLAND: B.P. crystals, 8½d. MANCHESTER: Commercial, 8¼d., M.P. 8½d.

POTASSIUM PRUSSIATE.—LONDON: 8½d. to 8¾d. per lb. SCOTLAND: Yellow spot material, 8½d. ex store. MANCHESTER: Yellow, 8½d.

SALAMMONIAC.—First lump spot, £42 17s. 6d. per ton d/d in barrels.

SODA ASH.—58% spot, £5 17s. 6d. per ton f.o.r. in bags, special terms for contracts.

SODA, CAUSTIC.—Solid 76/77° spot, £14 5s. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 15s. in casks, Solid 76/77%, £14 10s. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 10s. contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£22 per ton. LONDON: £23.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 10s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous, 5d. per lb. LONDON: 4d. per lb. with discounts for quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts. MANCHESTER: 4d. less 1 to 3½% contracts, 4d. spot lots.

SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d 1-cwt. iron drums for home trade.

SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d.

per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£32 per ton.

SODIUM CHROMATE.—3¾d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £15 ex station, 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.

SODIUM NITRITE.—LONDON: Spot, £18 to £20 per ton d/d station in drums.

SODIUM PERBORATE.—LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£12 10s. per ton.

SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 4¾d. to 5¾d.

SODIUM SILICATE.—140° Tw. Spot £8 5s. per ton d/d station, returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND: English material £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground Spot, £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 5s.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.

SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot, £9 10s. d/d station in bags.

SULPHATE OF COPPER.—MANCHESTER: £17 per ton f.o.b.

SULPHUR.—£11 10s. per ton. SCOTLAND: Flowers, £11; roll, £10 10s.; rock, £9; ground American, £10 ex store.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 4s. 3d. to 4s. 5d. per lb.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON AND SCOTLAND: £12 per ton.

ZINC SULPHIDE.—11d. to 1s. per lb.

## Pharmaceutical and Fine Chemicals

CADMIUM IODIDE.—14s. 6d. per lb.

IRON AMMON. CITRATE.—B.P., 1s. 9d. per lb.; green, 2s. 5d. per lb.

IRON QUININE CITRATE.—9¾d. to 1s. 0½d. per oz.

LINALOL (ex Shui oil).—5s. 9d. per lb.

LINALYL ACETATE.—Ex Bois de Rose, 7s. 6d. per lb.; ex Shui oil, 6s. 6d.

MENTHOL.—A.B.R. recryst., B.P., 15s. per lb.; synthetic detached crystals, 8s. 6d. to 10s. 6d. per lb.

PHENACETIN.—4s. to 4s. 6d. per lb.

## Essential Oils

BOURBON GERANIUM.—24s. 9d. per lb.

CAMPHOR, BROWN.—70s. per cwt.

CAMPHOR, WHITE.—75s. per cwt.

EUCALYPTUS.—Australian B.P. 70/75%, 1s. 2d. per lb.

LEMON.—4s. 6d. per lb.

LEMONGRASS.—3s. 5d. per lb.

ORANGE, SWEET.—6s. 6d. per lb.

PALMA ROSA.—8s. per lb.

PEPPERMINT.—Wayne County, 14s. 3d. per lb.

PETITGRAIN.—4s. 9d. per lb.

## Intermediates and Dyes

IN the following list of intermediates delivered prices include packages except where otherwise stated:—

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.

ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.

ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.

ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100% d/d buyer's works.

ACID, SULPHANILIC.—Spot, 8d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.

BENZIDINE BASE.—Spot, 2s. 5d. per lb. 100% d/d buyer's works.

*p*-CRESOL 34-5° C.—1s. 9d. per lb. in ton lots.

*m*-CRESOL 98/100%.—2s. 3d. per lb. in ton lots.

DICHLORANILINE.—2s. 3d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.

DINITROBENZENE.—8d. per lb.

DINITROTOLUENE.—48/50° C., 8d. per lb.; 66/68° C. 8¾d. per lb.

DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.

α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.

β-NAPHTHOL.—Spot, £78 15s. per ton in paper bags; £79 15s. in casks, in 1-ton lots.

α-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.

β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

*o*-NITRANILINE.—5s. 10d. per lb.

*m*-NITRANILINE.—Spot, 2s. 7d. per lb. d/d buyer's works.

*p*-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. per lb.; 5-cwt. lots, drums extra.

NITRONAPHTHALENE.—9d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.

*o*-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.

*p*-TOLUIDINE.—Spot, 1s. 11d. per lb., d/d buyer's works.

*m*-XYLIDINE ACETATE.—3s. 4d. per lb.

## Coal Tar Products

ACID, CARBOLIC.—Crystals, 9d. to 10d. per lb.; crude, 60's, 2s. 5d. to 2s. 6d. per gal.; 2% water 3s. 0¾d. MANCHESTER: Crystals, 9d. per lb.; crude, 2s. 6d. to 2s. 7d. per gal. SCOTLAND: 60's, 1s. 7d. to 1s. 8d.

ACID, CRESYLIC.—90/100%, 1s. 6d. to 1s. 8d. per gal.; pale, 98%, 1s. 4d. to 1s. 5d.; pale 95%, 11d. to 11½d.; dark, 10d., all according to specification; refined, 1s. 8d. to 1s. 9d. LONDON: 98/100%, 1s. 3d.; dark, 95/97%, 11d. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; 97/99%, 1s. to 1s. 1d.; dark, 97/99%, 11d. to 1s.; high boiling acid, 2s. 6d. to 3s.

ANTHRACENE OIL.—Strained, 4½d. per gal.

BENZOL.—At works, crude, 9d. to 9½d. per gal.; standard motor 1s. 4d. to 1s. 4½d.; 90%, 1s. 5d. to 1s. 6d.; pure, 1s. 7½d. to 1s. 8d. LONDON: Motor, 1s. 6½d. SCOTLAND: Motor, 1s. 6½d. to 1s. 7½d.; 90%, 2s. 0½d. to 2s. 1½d.

CREOSOTE.—B.S.I. Specification standard, 3d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 3d. to 3½d. f.o.r. North; 4d. to 4½d. London. MANCHESTER: 2¾d. to 4d. SCOTLAND: Specification oils, 3½d. to 4d.; washed oil, 3½d. to 4d.; light, 3d. to 3½d.; heavy, 4½d. to 5d.

NAPHTHA.—Solvent, 90/160%, 1s. 4d. to 1s. 5d. per gal.; 95/160%, 1s. 8d.; 90/190%, 11d. to 1s. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.

NAPHTHALENE.—Crude, Hot-Pressed, £6 1s. 3d. per ton. Flaked, £10 per ton. Purified crystals, £9 10s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.

PITCH.—Medium soft, £3 15s. to £4 per ton. MANCHESTER: £4 f.o.b. LONDON: £3 15s. f.o.b. East Coast port for next season's shipment.

PYRIDINE.—90/140, 4s. 3d. per gal.; 90/180, 2s. to 2s. 6d. SCOTLAND: 90/160% 4s. to 5s.; 90/220%, 3s. to 4s.

REFINED COAL TAR.—SCOTLAND: 4d. per gal.

TOLUOL.—90%, 2s. 4d. per gal.; pure, 2s. 8d.

XYLOL.—Commercial, 2s. 2d. to 2s. 3d. per gal.; pure, 2s. 4d.

## Nitrogen Fertilisers

SULPHATE OF AMMONIA.—The home price for delivery in 6-ton lots to consumer's nearest station during September and October is £6 15s. per ton. The export price continues steady at £6 7s. 6d. per ton for September shipment f.o.b. U.K. ports in single bags.

NITRO-CHALK.—The price for delivery up to June, 1934, in 6-ton lots carriage paid to farmer's nearest station remains at £7 5s. per ton.

BRITISH NITRATE OF SODA.—September and Octobere, £7 8s. 6d.; November, £7 11s.; December, £7 13s. 6d.; January, £7 16s.; February/June, £7 18s. 6d. These prices are the same as those now ruling for the Chilean product.

CALCIUM CYANAMIDE.—20.6% nitrogen, powdered and oiled, packed in paper lined 2-cwt. bags: September/October, £7 per ton; November, £7 1s.; December, £7 2s.; January, £7 3s.; February, £7 4s.; March/June, £7 5s.; carriage paid to any railway station in Great Britain in lots of 4 tons and over. Cyanamide is sold on the basis of 20.6% nitrogen with no charge for excess, but with an allowance for deficiency, if any, in analysis as follows: 1s. per ton if the percentage of nitrogen is under 20.6% but not less than 20.5%; 2s. per ton if the percentage of nitrogen is under 20.5% but not less than 20.25%; and 4s. per ton if the percentage of nitrogen is under 20.25% but not less than 20%.

CHILEAN NITRATE OF SODA.—For delivery in 6-ton lots, carriage paid to buyer's station, September and October, £7 8s. 6d. per ton; November, £7 11s. 3d.; December, £7 14s.; January £7 16s. 9d.; February/June, £7 19s. 6d.

CONCENTRATED COMPLETE FERTILISERS.—Prices for September delivery range from £10 9s. 6d. to £11 per ton, according to percentage of constituents.

## Latest Oil Prices

LONDON, August 30.—LINSEED OIL was easier. Spot, small quantities, £21 5s.; Sept., £19 15s.; Sept.-Dec., £20 2s. 6d.; Jan.-April, £20 17s. 6d. per ton, naked. RAPE OIL was quiet. Crude, extracted, £28 10s.; technical refined, £30 per ton, naked, ex wharf. COTTON OIL was dull. Egyptian crude, £21; refined common edible, £24, and deodorised £26 per ton, naked, ex mill. TURPENTINE was steady. American, spot, 48s. 6d. per cwt.

# From Week to Week

MR. C. P. HOLLAND, of Imperial Chemical Industries, Ltd., has been re-elected a vice-president of the Office Management Association. Sir Joseph Burn is president.

MR. THOMAS H. GOODWIN, B.Sc., who holds the Priestley scholarship for chemical research for this year, which is the bicentenary of Joseph Priestley's birth, has been granted a senior award by the Department of Scientific and Industrial Research, to be held at Birmingham University.

THE FLEETWOOD SALT WORKS, Lancashire, were closed down this week. The works, established nearly 30 years ago, were started by the United Alkali Co., Ltd., now part of I.C.I. At one time over 300 workers were employed, but now only 40 remain to be transferred to Runcorn or Stacord.

THE WIDNES INTER-WORKS CRICKET FINAL was played between two I.C.I. works, Pilkington-Sullivan and Gaskell-Marsh, on August 17 and 18. The competition is arranged by the Widnes Cricket Club, and as a result of their victory, the Gaskell-Marsh team will hold the T. Davies cup until next year.

MR. JAMES DODDS HENRY, aged 69, has died at Wraysbury, Middlesex. He was a journalist well known for his work in connection with oil technology, and was often called upon to advise companies exploiting new oil sources. He played an important part in the development of the Trinidad oilfields.

FOSFA, LTD., has been established to replace the Czechoslovak "Fosfacid" superphosphate cartel. All producers in the country are included in the new organisation. The only change registered is the absorption of the Silleiner Kunstdunger and Chemischen Industrie, A.G., by the Aussiger Verein.

THE BREWERS' EXHIBITION FOR 1933 has been cancelled. This has been decided because although the extra tax has been removed, the brewing industry has not yet returned to normal. The breweries have not been working full time, but it is hoped that conditions, which are gradually improving, will by next year justify the expense of an exhibition.

THE POSSIBILITIES OF YUCCA FIBRE as a substitute for cotton and jute are to be examined by experts in Germany, by order of the Government. It is claimed that the plant yields a fibre suitable for the manufacture of such diverse materials as packing threads and linen. The underlying motive of the German Government is to increase employment in agriculture by the cultivation of the Yucca plant.

THE NOMINAL CAPITAL of Henry Smith and Co., Ltd., chemical manufacturers, Diggle, near Oldham, has been increased by the addition of £2,000 in £1 ordinary shares beyond the registered capital of £6,000, and that of Ross (Gelatine), Ltd., manufacturers of gelatine, glue, etc., Newlay, Leeds, has been increased by the addition of £4,000 in £1 ordinary shares beyond the registered capital of £8,000.

IN THE RECENTLY ISSUED ANNUAL REPORT of Chemische Fabrik von Heyden A.G., of Dresden, the turnover in goods is recorded as being maintained at the previous 12 months' level, but the money value declined by about 8 per cent. Hopes are entertained of an impending revival in the heavy chemical branch. Export trade has been faced with further difficulties, but sales in the home market were maintained. For the purpose of improving the efficiency of existing plant and undertaking the manufacture of new products, a substantial proportion of the liquid assets have been ploughed back into the business, thus continuing the policy of previous years.

THE GERMAN ASSOCIATION OF MAKERS OF CHEMICAL APPARATUS AND PLANT—popularly known as Dechema—has published the "Normblatt" leaflets in book form. They are 102 in number, and treat of chemical apparatus and plant; in addition, this publication includes the names of 148 firms supplying standardised equipment, arranged alphabetically, according to locality, and in the order of the pamphlet index number. The triple tabulation has been made in order to facilitate reference. It is stated that the "Norm" pamphlets collection is only a limited edition, and can be obtained from the Association's offices at Beuth Verlag, Berlin, S.W.19, for 50 marks (about £3 10s. at the current rate of exchange).

THE NORTHERN ASPHALT WORKERS' UNION, perturbed at the serious decline in the demand for asphalt, suggests that steps be taken to test samples more thoroughly, and has issued instructions to members to carry out a policy of restricted output from September 1. The Asphalt Mine Owners' and Manufacturers' Council, also distressed by the state of the industry, has issued a brochure offering to users a guaranteed standard of mastic asphalt and workmanship, but the union argues that inferior materials and the speeding up methods of employers make it impossible for the operative to attain the standard offered. It is also stated that apprentices cannot receive efficient tuition under prevailing conditions in the industry.

RECENT WILLS INCLUDE that of John Ebenezer Hill, Stourbridge, formerley of the John Hill Galvanising Co., who left £2,839 (net personalty nil).

J. BROWN AND CO., chemical manufacturers, Savile Town, have sustained a severe loss by the death of Mr. Milton Walton, B.Sc., of Dewsbury, who had been with them for a long time. He was 60 years of age.

THE DEATH TOOK PLACE last Saturday of Mr. Bertram Stuart Straus, chairman of Virol, Ltd., and Radium Springs, Ltd. For about ten years Mr. Straus was a member of the L.C.C., and from 1906 to 1910 was Liberal M.P. for Mile End. He was chairman of Virol, Ltd., for over thirty years.

ACCORDING TO A REPORT in the "Chemische Fabrik," August 16 (page 347), the Norsk Hydro contemplate adding an ammonium sulphate plant to their existing works at Heroen. Work on the new plant will shortly be commenced and the production is intended for export.

THE LENINGRAD INSTITUTE FOR POLYGRAPHIC RESEARCH have been experimenting with bakelite as a suitable material for printers' quads. This was done owing to the difficulty of obtaining lead and zinc. It is stated that the experiments justify the mass production of bakelite quads.

SALT DEPOSITS HAVE BEEN DISCOVERED near Szeged, Hungary, which would supply the needs of the whole country if they were carefully exploited. The discovery is particularly fortunate for Hungary, as at present all the salt used in the country, valued at £143,000 annually, has to be imported.

MR. HARRY REID, a well-known china manufacturer in the Potteries, died on August 25 at Longton, Stoke-on-Trent, aged 65. He was a director of Reid and Co., and Shore and Coggins, both of Longton, and had been for many years a member of the English China Manufacturers' Association.

SIR MALCOLM ROBINSON, formerly chief inspector of factories, died on August 26, at Parkstone, Dorset, aged 76. He was a member of the departmental committees on the night employment of young persons, 1911, and on celluloid, 1912. He became chief inspector in 1917, and retired in 1920.

THE DISCOVERY OF NATURAL SOLIDIFIED CARBON DIOXIDE near Cracow, in the south of Poland, has aroused great interest among the professors at Cracow University. It was while work was proceeding on a boring for mineral water that the solidified carbon dioxide came to the surface from a depth of 2,800 feet, and quickly evaporated. Investigations are being made by the University.

THE VACANCY IN THE CHAIRMANSHIP of Triplex Safety Glass Co., Ltd., caused by the death of Lt.-Col. O. C. Clare, has been filled by the appointment of Major A. E. Phillips. Miss D. McDuell, the company's secretary, has been co-opted a director, but will not seek re-election at the general meeting on September 21. This step has been taken to comply with the articles of association, which state that there shall be not less than five directors of the company.

A CONTRACT WORTH £700,000 has been placed by the Argentine Government, subject to the approval of the Senate, with over a dozen British firms for the supply of galvanised iron sheets for locust fencing. The larger orders were placed with John Summers and Sons, John Lysaght and the Grovesend Steel and Tinplate Co. A sufficient number of sheets is required to form 11,000 miles of fencing, and the erection of the fences must be finished by December. A similar order went to the United States ten years ago.

AN ADDITION TO THE LIST OF EXHIBITORS at the Shipping, Engineering and Machinery Exhibition, published in the CHEMICAL AGE of August 12, is the Birmingham Battery and Metal Co., Ltd., Selly Oak, Birmingham, which is to exhibit a wide range of its non-ferrous tube and sheet productions on Stand No. 4, Row E. The exhibits include condenser tubes in all mixtures—in cupro-nickel as supplied to the Admiralty and in aluminium brass as supplied to leading steamship companies. An interesting part of the display will be the large brass tubes, specially balanced for paper rolls, and brass and copper tubes for sugar refineries.

THE IMPORT DUTIES ADVISORY COMMITTEE has received applications for an increase in the import duty on commercial grades of di-sodium and tri-sodium phosphates, raw gypsum stone (calcium sulphate), plaster of Paris, mineral white (ground gypsum), and calcium sulphate cements, and for the addition to the free list of pitch, or, alternatively, for drawback of duty until Section 9 of the Finance Act, 1932, on the pitch used in the manufacture of fuel briquettes. Representations should be addressed in writing to the Secretary, Import Duties Advisory Committee, Caxton House (West Block), Tothill Street, Westminster, London, S.W.1, not later than September 25.

## Company News

**Virginia-Carolina Chemical Co.**—For the year ended June 30, 1933, the report shows a net loss of $762,828, after providing for depreciation, losses on impounded bank accounts and federal stock tax. This compares with a net loss of $783,509 in the previous period. The current assets now stand at $11,589,222 and current liabilities $183,209.

**F. Steiner and Co.**—The directors state that after transferring £5,000 from income tax account, bringing in £8,525 surplus on realisation of investment, and providing £35,224 for repairs and depreciation of machinery, and after payment of debenture interest, there was a loss for the year ended July 31 last of £23,039. In the previous year the net profit amounted to £11,564, after crediting £23,992 profit on sale of investments.

**Pinchin, Johnson and Co., Ltd.**—An interim dividend has been declared at the rate of 6 per cent., less tax, on the 10s. ordinary shares, payable on September 18. The payment compares with 7½ per cent., a year ago, which was followed by a similar final distribution, making 15 per cent. for 1932.

**Reckitt and Sons, Ltd.**—The payment of an ordinary interim dividend of 1s. per share will be made on October 2.

**North Broken Hill, Ltd.**—A dividend of 1s. per share, payable in Melbourne on September 29, is announced.

**American Agricultural Chemical Co.**—The report for the year ended June 30 last, shows a net loss of $508,127 after providing for taxes, depreciation, depletion, possible credit losses and reserve for self insurance, comparing with a net loss in the previous year of $1,224,056.

**Bradford Dyers' Association, Ltd.**—It is announced that the directors have again decided to make no interim payment on the ordinary stock. The last interim payment was in respect of 1930, when 2 1/12 per cent. was paid, followed by a similar final.

**Curtis's and Harvey, Ltd.**—Notice has been given that the 4¼ per cent. first mortgage debenture stock will be redeemed at 105 per cent. on February 28, 1934. The interest due on November 1 will be paid in the usual way, while interest from that date to February 28, 1934, will be paid on the redemption date.

**Electrolytic Zinc Co. of Australasia, Ltd.**—A full year's dividend in respect of 1932 is announced on the 8 per cent. cumulative participating preference shares of £1, payable on November 2.

**Staveley Coal and Iron Co., Ltd.**—A final dividend of 2½ per cent., making 5 per cent., tax free, is to be paid for the year to June 30, 1933, the same as in the preceding twelve months.

**Triplex Safety Glass Co., Ltd.**—The report for the year to June 30 last, discloses trading profits of £97,225, compared with £74,495, a year ago; the net profit is £78,131. After allowing £22,500 for tax, against £13,000, and adding the amount brought in, the available total is £76,911, out of which the dividend of 25 per cent. absorbs £37,500, while £25,000 is transferred to general reserve. The carry-forward is thus reduced from £21,279 to £14,411.

**Eastwoods Cement, Ltd.**—The trading profits for the year to March 31 last amounted to £16,133 compared with £28,753 in the previous year. After depreciation, etc., the net profit is £4,130, against £14,068. The available total is £12,426, and, after a dividend of 3 per cent., less tax, the amount to be carried forward is £6,426, against £8,296 brought in. The annual meeting will be held at River Plate House, London, on September 6, at 3 p.m.

**United Turkey Red Co.**—The board announces half-yearly dividends on the first and second preference shares, but no interim has been declared on the ordinary shares.

## Books Received

**Economic Conditions in Germany.** To June 1933. By J. W. F. Thelwall. Department of Overseas Trade. London: H.M. Stationery Office. Pp. 166. 4s. 6d.

## Chemical Trade Inquiries

**The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).**

**Austria.**—An agent established at Vienna wishes to obtain the representation of United Kingdom manufacturers of industrial chemicals. (Ref. No. 217.)

**Australia.**—A business man shortly returning to Australia desires to obtain agencies for transparent paper, etc., and would consider the purchase of suitable goods. Letters should be addressed, in the first place, to Australia House, Strand, W.C.2. (Ref. No. Com. 412/7/1/1/697.)

**Belgium.**—A firm of agents established at Brussels wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of pharmaceutical and perfumery specialities. (Ref. No. 220.)

**Cyprus.**—A firm of import and export agents at Larnaca desires to secure the agency of United Kingdom manufacturers of pharmaceutical preparations and soya bean oil on a commission basis. (Ref. No. 210.)

**Egypt.**—The Commercial Secretary to the Residency, Egypt, reports that the Egyptian Ministry of Public Works is calling for tenders to be presented in Cairo by September 18, 1933, for the supply of cotton waste, red lead paint powder and grey oil paint. (Ref. F.Y. 1838), and for tenders, to be presented in Egypt by October 7, 1933, for the supply of 31,150 kilograms of mineral lubricating oils. (Ref. B.Y. 7643.)

**Morocco (French Zone).**—The British Consul at Casablanca reports that the Public Health Department of the French Zone of Morocco is calling for tenders, to be presented in Morocco by September 16, 1933, for the supply of 1,000 kilogs. of basic hydrochlorate of quinine, Codex 1884 (Lot 1); 1,000 kilogs. of bisulphate of quinine, Codex 1884 (Lot 2); 1,500 kilogs. of iodide of potassium, crystallised, Codex 1908; 100 kilogs. of iodoform powdered Codex 1908; 150 kilogs. iodine, resublimed, Codex 1908 (Lot 3). (Ref. F.Y. 1839.)

**South Africa.**—The British Senior Trade Commissioner in South Africa reports that the South African Railways and Harbours Administration is calling for tenders (Tender No. 112), to be presented in South Africa by October 23, 1933, for the supply of 8,264 imperial gallons of machine oil. (Ref. B.Y. 7644.)

## New Chemical Trade Marks

**Compiled from official sources by Gee and Co., Patent and Trade Mark Agents, 51-52 Chancery Lane, London, W.C.2.**

Opposition to the registration of the following trade marks can be lodged up to September 9, 1933.

**Acidex.** 542,176. Class 1. Bituminous paints. The Graphite Oils Co., Ltd., Reliance Works, Immingham Dock, Lincolnshire. June 10, 1933.

**Corintron.** 542,395. Class 1. Chemical substances for use in dyeing and printing textile fabrics and leather in the course of manufacture. J. R. Giegy, Societe Anonyme (a Joint Stock Company organised and existing under the laws of Switzerland), 215 Schwarzwaldallee, Basle 16, Switzerland. June 19, 1933.

**Agripon.** 542,094. Class 2. Chemical substances used for agricultural purposes. Bayer Products, Ltd., 31 to 34 Basinghall Street, London, E.C.2. June 8, 1933.

Opposition to the registration of the following trade marks can be lodged up to September 16, 1933.

**Keratekt.** 542,670. Class 1. Preservative dressings for wood, stonework, brickwork and metal. H. Windsor and Co., Ltd., 748 Fulham Road, Fulham, London, S.W.6. June 29, 1933.

**Keratex.** 542,671. Class 1. Anti-corrosives in paint and paste form. H. Windsor and Co., Ltd., 748 Fulham Road, London, S.W.6. June 29, 1933.

**Keraetol.** 542,673. Class 1. Oil-resisting lacquers. H. Windsor and Co., Ltd. June 29, 1933.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